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(ALA — A.R.C. — U.S.O.)
To the Armed Forces and Merchant Marine

PRACTICAL EXERCISES

IN

COMMERCIAL ARITHMETIC

PREPARED FOR

EXCLUSIVE USE IN THE BRYANT & STRATTON
COMMERCIAL SCHOOL OF BOSTON

PUBLISHED BY
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PREFACE.

THIS book has been prepared to meet the requirements of the Bryant & Stratton School of Boston.

The authors have been engaged many years in teaching arithmetic as applied in business calculations, and their intimate acquaintance with the needs of business students has suggested the general plan and scope of this treatise.

CONTENTS.

	PAGE
ADDITION	7
MULTIPLICATION TABLE	14
FRACTIONS	15
Common Fractions	15
Definitions	15
Reduction	15–17
Addition	18
Subtraction	19, 20
Multiplication	21
Division	22–24
Decimal Fractions	24
Definitions	24
Reduction	25
Addition	26
Subtraction	27
Multiplication	27
Division	28, 29
Miscellaneous Problems	30
INTEREST	34
Definitions	34
Computing Time	34
Six Per Cent. Method	36
Short Cuts for Reckoning Interest	37
Accurate Interest	43
Problems	45
PARTIAL PAYMENTS	49
BANK DISCOUNT	55
AVERAGING OF ACCOUNTS	66
Definitions	66
Simple	67
Average Term of Credit	70
Compound	72
Account Sales	76
PERCENTAGE	81

PAGE

TRADE DISCOUNTS 91
PROFIT AND LOSS 99
COMMISSION AND BROKERAGE 110
TAXES 119
DUTIES 122
Ad Valorem 126
Specific 126

INSURANCE 129
Definitions 129
Fire Insurance 130
Marine Insurance 131

EXCHANGE 135
Domestic Exchange 136
Foreign Exchange 140

STOCKS AND BONDS 146
The Stock Exchange 153

PARTNERSHIP 158
Simple Partnership Average 159
Compound Partnership Average 161
Account Current 165

COMPOUND INTEREST 167
ANNUAL INTEREST 169
MEASURES OF VALUES, WEIGHTS, CAPACITIES, EXTENT, AND TIME 171
Measures 171
Values 171
English Money 172
Weight 173
Capacity 175
Extent 176
Time 179
Miscellaneous 180

REVIEW PROBLEMS 181

COMMERCIAL ARITHMETIC.

ADDITION.

1.

1.	*2.*	*3.*	*4.*	*5.*	*6.*
246	986	408	699	874	987
837	742	695	785	783	876
562	894	786	983	694	789
789	675	985	872	785	975
651	589	873	556	983	899
934	697	987	872	674	768
875	583	675	295	569	587
698	987	453	984	989	679

NOTE. — The pupil should practice on each of the above columns until the correct sum is obtained in less than 15 seconds.

7.	*8.*	*9.*	*10.*	*11.*	*12.*
327	976	807	639	553	745
496	894	750	446	676	678
989	567	981	809	785	873
684	896	785	970	496	494
468	787	587	872	864	999
486	888	694	985	972	876
879	974	986	543	431	989
989	875	875	479	239	224
874	124	989	897	984	615
872	462	873	576	763	822
976	873	496	875	874	598
872	979	987	964	565	444

NOTE. — Secure each sum in 25 seconds or less.

13.	*14.*	*15.*	*16.*	*17.*
6749	4968	6987	5968	3289
3285	7945	7878	6879	4398
8396	9872	8789	7988	5489
7249	4964	7898	8977	6578
8106	8981	8789	7866	7689
6867	9898	7678	6777	8778
5432	6567	7643	5688	9889
9383	6749	7678	6777	8778
7394	9858	6567	5676	7667
8492	7679	5456	4565	6556
7653	6588	4345	3454	5445
9765	8765	5480	4567	6897
9795	8792	4679	6879	7468
8394	9876	8486	4965	6743
6787	8798	8224	2064	4040
5895	6535	3294	9876	2485

NOTE. — Practice until each column can be added correctly in one minute.

18.	*19.*	*20.*	*21.*	*22.*
398768	987645	876384	984974	674359
463984	876467	684397	998496	567468
678875	967589	796568	687387	988577
789967	874841	987273	894579	765686
897875	998432	778889	798368	647377
654384	898398	674573	897257	407588
546495	698776	899865	766746	890395
695587	598687	798983	673585	874586
887576	764069	808074	964924	987373
978687	467487	976389	871897	587424
865753	898636	878563	948526	675898
983764	987327	889374	786547	486387
384766	873496	674089	458358	698354
983842	897988	987690	835695	587906
864326	894377	396487	384678	483289
955875	725779	784397	865391	768574

NOTE. — Practice until correct sum can be obtained in 90 seconds.

23.	*24.*	*25.*	*26.*	*27.*
246857	676434	768968	783497	863247
354088	467549	687857	874589	554978
465199	578436	767896	767878	768768
578286	687548	858754	876545	976943
486768	576657	767843	767834	887293
575677	687945	656782	674343	768732
543286	768936	376899	546738	485473
687965	687847	876548	457686	996387
873484	768768	768457	566577	868750
984373	659659	975834	675469	790768
895483	736534	896453	482323	882653
564592	645936	762315	895234	560768

NOTE. — Practice on the above so that correct sum can be secured in 60 seconds.

28.	*29.*	*30.*	*31.*	*32.*
47686	87694	97683	43425	84496
32871	67235	64386	54636	98724
64386	59876	54539	67385	87685
58769	48685	68547	76849	68973
87543	59864	53876	87432	97656
54398	89795	98786	98543	68973
65487	78886	87645	32814	67598
98764	45706	67032	76805	88973
98764	87643	54703	70673	37684
48476	76435	48760	34678	49576
54327	65746	59476	67463	58798
32406	54324	56896	54768	86879
24989	67432	40683	67382	33250
87630	46750	54321	13256	36483
14873	32984	36897	87643	89875
82421	57427	98562	45816	78896
56421	83624	69232	78675	79760
79664	54177	88642	63476	67394

NOTE. — Practice on the above until correct sum can be obtained in 90 seconds.

33.	*34.*	*35.*	*36.*
$3965.45	$4964.36	$5986.74	$8873.44
4874.80	3473.47	4875.65	7784.56
6585.74	4584.58	5786.76	8673.67
3967.86	5675.67	6784.94	3064.40
4876.95	4768.90	8678.49	4678.65
6958.85	5876.86	7567.38	3787.74
8436.96	6965.75	8678.46	4032.65
7547.83	7856.84	7567.33	3909.53
8765.75	6745.73	6456.26	4872.23
5896.89	5987.46	3264.14	3241.18
9765.76	4768.12	1246.21	4687.47
6894.83	3688.41	4682.94	3856.39
7543.21	4512.93	5641.45	8172.39
8965.87	5621.82	6156.34	5622.07
6743.76	6578.43	6657.24	4569.78

NOTE. — 90 seconds.

37.	*38.*	*39.*	*40.*
$6973.28	$4867.48	$6843.14	$6898.72
9855.83	3576.39	7839.24	5769.81
7694 76	1248.46	6730.00	5400.40
9578.55	2460.91	8746.98	6583.12
8287.98	1678.48	7684.46	3872.24
7393.25	2486.18	4678.04	2416.64
8979.37	6987.29	3787.16	3723.53
6883.86	7846.38	4873.42	4484.64
9576.94	2460.10	2186.47	3284.99
7654.86	8754.11	1467.49	4876.88
9873.72	7687.44	3684.81	3206.78
8742.36	6789.46	4873.92	4387.14
9873.54	6000.45	4550.50	6874.49
7698.73	5432.24	9806.75	4249.61
2875.93	4552.13	8157.92	9146.24
4732.84	7145.65	9581.26	5721.45
8497.48	9763.73	5569.32	6697.86

NOTE. — 90 seconds.

41.	*42.*	*43.*	*44.*	*45.*
476	673	497	678	784
984	565	873	875	693
436	764	772	976	487
478	873	585	471	873
146	234	678	273	985
249	347	548	398	976
496	578	673	887	873
584	873	643	794	859
693	242	784	673	873
549	486	373	486	985
238	398	989	888	999
444	343	284	386	888
695	594	486	498	777
646	878	980	406	877
307	460	874	908	665
896	375	264	304	454
784	795	684	896	989
483	374	321	498	767
896	484	683	320	564
590	896	764	896	982
684	580	765	875	678
538	429	326	764	953
647	742	645	546	879
843	349	946	657	765
954	458	354	548	999
765	567	463	457	878
872	697	896	654	545
983	784	654	549	876
235	241	463	770	784
609	361	654	741	987
750	906	754	891	675
906	860	950	906	565
860	790	845	986	784
765	865	763	256	320
764	893	965	901	907
663	701	732	753	870
231	754	652	954	988
643	675	732	793	767

NOTE. — 100 seconds.

46.	*47.*	*48.*	*49.*
$3268.72	$46876.48	$14.40	$46874.95
639.53	3724.60	698.74	68769.46
7432.96	39.74	9872.50	3600.49
4872.25	148.96	68783.75	369.38
423.37	19.04	64.80	478.49
3498.69	376.67	782.44	4387.38
6400.60	4600.80	83.96	38.49
869.75	460.07	6.40	54686.30
84.69	3.09	5.00	698.72
4325.65	47684.49	486.50	5.50
362.72	679.18	67.90	5468.00
17.86	50.05	6000.00	360.06
9.87	2468.64	904.60	76.57
120.65	13468.64	38.04	18724.69
8240.87	6478.64	144.64	482.90
964.25	98764.97	3482.19	67.96
65.96	674.05	14784.25	124.87
4900.75	6.50	2000.10	97.99
49.26	18.78	464.20	4240.88
4688.72	249.58	36.82	36.44
920.74	16.66	9.50	900.89
926.00	6.75	41.20	65432.14
8720.49	14687.90	683.98	5432.24
632.10	99.85	1876.46	341.25
3476.30	6.73	872.94	28.16
974.84	982.49	67.86	9.28
193.45	7865.50	5.86	428.48
60.25	68754.89	14683.85	58672.15
478.36	60.54	3698.40	640.10
4068.95	249.89	657.37	49.56
300.76	12.65	4546.48	6873.46
96.82	248.04	387.39	398.40
3472.75	9.86	4.78	3.96
320.89	14687.41	4872.90	454.98
65.87	575.41	372.50	64.76
9873.64	65.15	6453.85	189.96
845.72	654.10	6432.41	1543.07
98764.83	12342.78	7425.10	52456.90
3635.95	21366.75	1346.97	76597.21

2. Complete the following statements by adding downwards and from left to right.

Table may also be used for rapid drill exercises in addition.

SALES FOR THE MONTH ENDING SEPT. 30, 1907.

		Sugar.	Flour.	Potatoes.	Molasses.	Apples.	Totals.
Sept.	3	$847.40	$684.50	$210.25	$768.94	$1046.90	.....
	4	670.85	594.64	308.46	876.50	987.65	.....
	5	984.60	740.80	246.20	798.24	1262 56	.....
	6	872.41	674.89	260.48	982.14	1140.70	.....
	7	764.10	703.64	370.64	878.29	973.60	.....
	9	873.44	816.40	216.19	784.15	882.14	.....
	10	693.14	641.18	260.25	986.64	1140.40	.....
	11	762.46	893.29	361.14	764.84	982.56	.....
	12	982.16	789 30	244.60	698.74	1040.86	.....
	13	814.41	982.40	360.80	998.42	1240.84	.....
	14	672.41	868.72	304.68	698.44	1120.74	.....
	16	784.20	786.45	284.86	942.69	983.46	.....
	17	876.44	872.96	314.79	864.38	879.20	.....
	18	684.20	794.80	245.16	750.80	982.16	.....
	19	784.16	642.14	212.16	875.25	1024.26	.....
	20	876.24	762.81	249.28	762.14	983.46	.....
	21	672.10	674.40	211.14	674.23	1200.40	.....
	23	714.24	872.90	216.24	583.34	982.64	.....
	24	671.04	562.82	306.28	674.47	872 93	.....
	25	549.05	896.76	896.14	785.58	1043.84	.....
	26	672 64	764.85	642.44	696.67	954.93	.....
	27	792.36	644.68	306.86	587.78	865.84	.....
	28	989.14	567.96	296.78	698.89	986.95	.....
	30	946.28	872.89	306.99	589.78	1096.86	.....
Totals.		.....	.....	.....	.....	.....	.....

3. MULTIPLICATION TABLE.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50
3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63	66	69	72	75
4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84	88	92	96	100
5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126	132	138	144	150
7	14	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140	147	154	161	168	175
8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144	152	160	168	176	184	192	200
9	18	27	36	45	54	63	72	81	90	99	108	117	126	135	144	153	162	171	180	189	198	207	216	225
10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250
11	22	33	44	55	66	77	88	99	110	121	132	143	154	165	176	187	198	209	220	231	242	253	264	275
12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300
13	26	39	52	65	78	91	104	117	130	143	156	169	182	195	208	221	234	247	260	273	286	299	312	325
14	28	42	56	70	84	98	112	126	140	154	168	182	196	210	224	238	252	266	280	294	308	322	336	350
15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	360	375
16	32	48	64	80	96	112	128	144	160	176	192	208	224	240	256	272	288	304	320	336	352	368	384	400
17	34	51	68	85	102	119	136	153	170	187	204	221	238	255	272	289	306	323	340	357	374	391	408	425
18	36	54	72	90	108	126	144	162	180	198	216	234	252	270	288	306	324	342	360	378	396	414	432	450
19	38	57	76	95	114	133	152	171	190	209	228	247	266	285	304	323	342	361	380	399	418	437	456	475
20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500
21	42	63	84	105	126	147	168	189	210	231	252	273	294	315	336	357	378	399	420	441	462	483	504	525
22	44	66	88	110	132	154	176	198	220	242	264	286	308	330	352	374	396	418	440	462	484	506	528	550
23	46	69	92	115	138	161	184	207	230	253	276	299	322	345	368	391	414	437	460	483	506	529	552	575
24	48	72	96	120	144	168	192	216	240	264	288	312	336	360	384	408	432	456	480	504	528	552	576	600
25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600	625
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

NOTE. — To memorize the above table will be of inestimable value to one preparing for mercantile life.

FRACTIONS.

4. A FRACTION is part of a whole number.

$3 \div 4$ is written $\frac{3}{4}$.

5. The NUMERATOR is the number written above the horizontal line.

6. The DENOMINATOR is the number written below the horizontal line.

7. The Numerator and Denominator are called the terms of a fraction.

8. A PROPER FRACTION is one whose numerator is less than its denominator.

$\frac{3}{4}$, $\frac{7}{8}$, $\frac{2}{3}$.

9. An IMPROPER FRACTION is one whose numerator is equal to, or greater than, its denominator.

$\frac{8}{5}$, $\frac{3}{2}$, $\frac{4}{4}$.

10. A MIXED NUMBER is a whole number and a fraction united.

$3\frac{1}{2}$ $2\frac{7}{8}$, $4\frac{1}{4}$.

11. To change a fraction to its lowest terms.

RULE. — *Divide the terms by some number that will divide them both without a remainder. Continue the operation until the terms are prime to each other.*

NOTE. — Numbers are prime to each other when no number except one will divide two or more of them without a remainder.

ILLUSTRATIVE EXAMPLE.

Reduce $\frac{144}{336}$ to its lowest terms.

$\frac{144}{336}$ $\frac{72}{168}$ $\frac{36}{84}$ $\frac{18}{42}$ $\frac{9}{21}$ $\frac{3}{7}$.

EXAMPLES.

1.	$\frac{6}{16}$.	*6.*	$\frac{448}{960}$.
2.	$\frac{8}{48}$.	*7.*	$\frac{162}{243}$.
3.	$\frac{27}{81}$.	*8.*	$\frac{72}{936}$.
4.	$\frac{64}{256}$.	*9.*	$\frac{256}{1024}$.
5.	$\frac{63}{189}$.	*10.*	$\frac{108}{604}$.

12. To change a mixed number to an improper fraction.

RULE. — *Multiply the whole number by the denominator of the fraction, to the product add the numerator, and under the sum write the given denominator.*

ILLUSTRATIVE EXAMPLE.

Change $8\frac{5}{6}$ to an improper fraction.

$8\frac{5}{6}$

6

48

5

$\frac{53}{6}$

EXAMPLES.

1.	$2\frac{2}{3}$.	*6.*	$15\frac{7}{18}$.
2.	$3\frac{3}{4}$.	*7.*	$23\frac{7}{10}$.
3.	$5\frac{7}{8}$.	*8.*	$36\frac{17}{33}$.
4.	$9\frac{13}{16}$.	*9.*	$71\frac{5}{9}$.
5.	$12\frac{5}{7}$.	*10.*	$83\frac{19}{21}$.

13. To change an improper fraction to a whole or mixed number.

RULE. — *Divide the numerator by the denominator. Write the remainder over the denominator and annex the fraction to the quotient.*

ILLUSTRATIVE EXAMPLE.

Change $\frac{12}{3}$ and $\frac{17}{4}$ to whole or mixed numbers.

$$3\overline{)12}\quad 4 \qquad 4\overline{)17}\quad 4\tfrac{1}{4}$$
$$12 \qquad 16$$
$$\overline{1}$$

EXAMPLES.

1.	$\frac{9}{3}$.	6.	$\frac{28}{8}$.
2.	$\frac{16}{2}$.	7.	$\frac{25}{6}$.
3.	$\frac{14}{7}$.	8.	$\frac{46}{7}$.
4.	$\frac{15}{8}$.	9.	$\frac{56}{16}$.
5.	$\frac{17}{3}$.	10.	$\frac{128}{24}$.

14. To change two or more fractions to equivalent fractions having a least common denominator.

RULE. — *Arrange the fractions in a horizontal line. Divide the denominators by some number that will divide the greatest number of them without a remainder. Repeat this operation with the several quotients and undivided denominators. Proceed in this manner until no number can be found which will divide two or more of them without a remainder.*

Multiply the several divisors and the last quotients and the product will be the least common denominator.

For the new numerator of each fraction, divide the least common denominator by the denominator of the fraction and multiply the quotient by the numerator.

ILLUSTRATIVE EXAMPLE.

Reduce $\frac{3}{8}$, $\frac{7}{16}$, $\frac{5}{28}$, $\frac{3}{32}$, to fractions having a least common denominator.

	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{5}{28}$	$\frac{3}{32}$
4)	8	16	28	32
2)	2	4	7	8
2)	1	2	7	4
	1	1	7	2

$4 \times 2 \times 2 \times 7 \times 2 = 224$, least common denominator.

8) 224	16) 224	28) 224	32) 224
28	14	8	7
3	7	5	3
$\frac{84}{224}$	$\frac{98}{224}$	$\frac{40}{224}$	$\frac{21}{224}$

EXAMPLES.

1. $\frac{2}{4}, \frac{5}{8}, \frac{2}{3}, \frac{7}{16}$.
2. $\frac{5}{9}, \frac{4}{7}, \frac{8}{27}, \frac{5}{36}$.
3. $\frac{1}{4}, \frac{1}{6}, \frac{2}{13}, \frac{10}{22}$.
4. $\frac{7}{16}, \frac{9}{64}, \frac{20}{128}, \frac{71}{256}$.
5. $\frac{8}{15}, \frac{7}{10}, \frac{3}{60}, \frac{7}{25}$.

15. To add fractions.

RULE. — *Reduce the fractions to a common denominator. Add the numerators and write the sum over the common denominator.*

ILLUSTRATIVE EXAMPLE.

Add $\frac{3}{4}$, $\frac{2}{3}$, $\frac{7}{12}$, and $\frac{9}{16}$.

$$\begin{array}{r|cccc} & \frac{3}{} & \frac{2}{} & \frac{7}{} & \frac{9}{} \\ 4)4 & & 3 & 12 & 16 \\ \hline 3)1 & & 3 & 3 & 4 \\ \hline & 1 & 1 & 1 & 4 \end{array}$$

$4 \times 3 \times 4 = 48.$

$$\begin{array}{r} 4)48 \\ \hline 12 \\ 3 \\ \hline 36 \\ 32 \\ 28 \\ 27 \\ \hline 48)123(2\frac{9}{16} \\ 96 \\ \hline 27 \\ \frac{27}{48} \quad \frac{9}{16} \end{array}$$

$$\begin{array}{r} 3)48 \\ \hline 16 \\ 2 \\ \hline 32 \end{array} \qquad \begin{array}{r} 12)48 \\ \hline 4 \\ 7 \\ \hline 28 \end{array} \qquad \begin{array}{r} 16)48 \\ \hline 3 \\ 9 \\ \hline 27 \end{array}$$

EXAMPLES.

1. $\frac{2}{3} + \frac{3}{4}$.
2. $\frac{7}{8} + \frac{5}{16} + \frac{9}{32}$.
3. $\frac{3}{5} + \frac{9}{10} + \frac{18}{25}$.
4. $\frac{6}{7} + \frac{3}{11} + \frac{17}{22} + \frac{5}{8}$.
5. $\frac{5}{9} + \frac{4}{27} + \frac{1}{33} + \frac{17}{42}$.
6. $\frac{1}{3} + \frac{2}{3} + \frac{3}{16} + \frac{1}{64}$.
7. $\frac{5}{12} + \frac{8}{9} + \frac{13}{24} + \frac{1}{6}$.
8. $\frac{8}{15} + \frac{1}{13} + \frac{3}{35} + \frac{19}{40}$.
9. $\frac{1}{7} + \frac{1}{9} + \frac{2}{15} + \frac{1}{5}$.
10. $\frac{8}{21} + \frac{4}{7} + \frac{3}{8} + \frac{7}{15}$.

16. To add mixed numbers.

RULE. — *Add the whole numbers. Add the fractions. Add the two results.*

ILLUSTRATIVE EXAMPLE.

Add $2\frac{1}{3}$ and $3\frac{1}{4}$.

$$\begin{array}{rr} 3\frac{1}{4} & \frac{3}{12} \\ 2\frac{1}{3} & \frac{4}{12} \\ \hline 5 & \frac{7}{12} \\ \frac{7}{12} & \\ \hline 5\frac{7}{12} & \end{array}$$

EXAMPLES.

1. $2\frac{1}{3} + 4\frac{5}{6}$.
2. $3\frac{1}{4} + 2\frac{5}{8} + 5\frac{7}{16}$.
3. $4\frac{1}{7} + 5\frac{1}{6} + 7\frac{3}{14}$.
4. $1\frac{2}{9} + 3\frac{1}{6} + 4\frac{11}{24}$.
5. $7\frac{1}{16} + 4\frac{3}{13} + 7\frac{15}{26}$.

17. To subtract fractions.

RULE. — *Reduce fractions to a common denominator. Subtract the numerators and write the result over the common denominator.*

ILLUSTRATIVE EXAMPLE.

Subtract $\frac{5}{8}$ from $\frac{2}{3}$.

$$\begin{array}{r} \frac{2}{3} = \frac{16}{24} \\ \frac{5}{8} = \frac{15}{24} \\ \hline \frac{1}{24} \end{array}$$

EXAMPLES.

1. $\frac{7}{8} - \frac{5}{8}$.
2. $\frac{6}{11} - \frac{3}{11}$.
3. $\frac{3}{4} - \frac{2}{3}$.
4. $\frac{7}{9} - \frac{3}{5}$.
5. $\frac{8}{15} - \frac{1}{3}$.
6. $\frac{7}{12} - \frac{4}{9}$.
7. $\frac{13}{20} - \frac{5}{24}$.
8. $\frac{29}{50} - \frac{7}{20}$.
9. $\frac{5}{7} - \frac{8}{21}$.
10. $\frac{37}{80} - \frac{5}{16}$.

18. To subtract mixed numbers.

RULE. — *Subtract the fractions. If the fraction of the minuend is less than the fraction of the subtrahend, borrow a unit from the whole number of the minuend. Subtract the whole numbers. Add the results.*

ILLUSTRATIVE EXAMPLE.

Subtract $2\frac{5}{8}$ from $5\frac{5}{9}$.

$$\begin{array}{l} 4\frac{5}{9} \\ 2\frac{5}{8} \\ \hline 2 \\ \quad \frac{67}{72} \\ \hline 2\frac{67}{72} \end{array} \qquad \begin{array}{l} \frac{40}{72} + 1 = \frac{112}{72} \\ \frac{45}{72} \\ \hline \frac{67}{72} \end{array}$$

EXAMPLES.

1.	$4\frac{5}{7} - 2\frac{2}{7}$.	*6.*	$4\frac{1}{4} - 2\frac{1}{3}$.
2.	$7\frac{9}{16} - 3\frac{5}{36}$.	*7.*	$8\frac{3}{7} - 2\frac{9}{14}$.
3.	$8\frac{1}{4} - 5\frac{3}{32}$.	*8.*	$9\frac{2}{3} - 6\frac{3}{5}$.
4.	$15\frac{7}{8} - 7\frac{7}{8}$.	*9.*	$12\frac{31}{64} - 8\frac{7}{16}$.
5.	$5\frac{1}{3} - 3\frac{1}{3}$.	*10.*	$19\frac{4}{21} - 18\frac{6}{7}$.

19. To subtract a fraction or mixed number from a whole number.

RULE. — *Borrow a unit from whole number of minuend and from it take the fraction. Subtract the whole numbers.*

ILLUSTRATIVE EXAMPLES.

Subtract $2\frac{1}{4}$ from 7.

$$\begin{array}{l} 6\frac{4}{4} \\ 2\frac{1}{4} \\ \hline 4\frac{3}{4} \end{array}$$

Subtract $\frac{3}{8}$ from 5.

$$\begin{array}{l} 4\frac{8}{8} \\ \quad \frac{3}{8} \\ \hline 4\frac{5}{8} \end{array}$$

EXAMPLES.

1.	$7 - \frac{2}{5}$.	*6.*	$7 - 2\frac{1}{4}$.
2.	$8 - \frac{1}{4}$.	*7.*	$8 - 7\frac{7}{8}$.
3.	$9 - \frac{4}{5}$.	*8.*	$14 - 12\frac{9}{16}$.
4.	$12 - \frac{7}{8}$.	*9.*	$17 - 9\frac{21}{32}$.
5.	$15 - \frac{9}{10}$.	*10.*	$18 - 17\frac{35}{64}$.

20. To multiply a fraction by a fraction.

RULE. — *Multiply the numerators together for a new numerator and the denominators together for a new denominator. Reduce the new fraction to its lowest terms.*

REMARK. — This rule will also apply to the multiplication of more than two fractions.

ILLUSTRATIVE EXAMPLE.

Multiply $\frac{7}{8}$ by $\frac{3}{5}$.

$$\frac{7}{8} \text{ by } \frac{3}{5} = \frac{7 \text{ by } 3}{8 \text{ by } 5} = \frac{21}{40}.$$

EXAMPLES.

1.	$\frac{3}{4}$ by $\frac{2}{3}$.	*6.*	$\frac{6}{7}$ by $\frac{5}{9}$.
2.	$\frac{1}{3}$ by $\frac{1}{5}$.	*7.*	$\frac{8}{15}$ by $\frac{3}{4}$.
3.	$\frac{3}{7}$ by $\frac{5}{6}$.	*8.*	$\frac{2}{3}$ by $\frac{3}{8}$ by $\frac{7}{16}$.
4.	$\frac{4}{5}$ by $\frac{7}{8}$.	*9.*	$\frac{4}{5}$ by $\frac{7}{10}$ by $\frac{15}{21}$.
5.	$\frac{3}{10}$ by $\frac{2}{5}$.	*10.*	$\frac{3}{8}$ by $\frac{2}{9}$ by $\frac{16}{60}$.

21. To multiply a fraction by a whole number, or a whole number by a fraction.

ILLUSTRATIVE EXAMPLE.

Multiply $\frac{3}{13}$ by 5.

$$\frac{3}{13} \text{ by } 5 = \frac{3}{13} \text{ by } \frac{5}{1} = \frac{15}{13} = 1\frac{2}{13}$$

EXAMPLES.

1.	$\frac{3}{7}$ by 4.	*6.*	5 by $\frac{3}{5}$.
2.	$\frac{7}{9}$ by 8.	*7.*	6 by $\frac{9}{24}$.
3.	$\frac{8}{13}$ by 5.	*8.*	7 by $\frac{3}{21}$.
4.	$\frac{1}{7}$ by 4.	*9.*	8 by $\frac{9}{72}$.
5.	$\frac{5}{14}$ by 6.	*10.*	9 by $\frac{3}{13}$.

22. To multiply a mixed number by a whole number, or a whole number by a mixed number.

ILLUSTRATIVE EXAMPLES.

Multiply $3\frac{1}{4}$ by 5.

$$\begin{array}{ll} 3\frac{1}{4} & \\ \underline{\quad 5} & \\ 15 & (5 \text{ by } 3) \\ \underline{1\frac{1}{4}} & (5 \text{ by } \frac{1}{4}) \\ 16\frac{1}{4} & \end{array}$$

Multiply 8 by $2\frac{3}{7}$.

$$\begin{array}{ll} 8 & \\ 2\frac{3}{7} & \\ \hline 16 & (8 \text{ by } 2) \\ 3\frac{3}{7} & (\frac{3}{7} \text{ by } 8) \\ \hline 19\frac{3}{7} & \end{array}$$

EXAMPLES.

1.	$2\frac{1}{4}$ by 3.	*6.*	4 by $3\frac{1}{4}$.
2.	$3\frac{1}{6}$ by 9.	*7.*	5 by $6\frac{3}{10}$.
3.	$4\frac{2}{5}$ by 15.	*8.*	6 by $3\frac{1}{3}$.
4.	$6\frac{3}{7}$ by 14.	*9.*	7 by $4\frac{3}{7}$.
5.	$7\frac{3}{8}$ by 16.	*10.*	12 by $5\frac{1}{6}$

23. To multiply a mixed number by a mixed number.

ILLUSTRATIVE EXAMPLE.

Multiply $4\frac{1}{4}$ by $2\frac{2}{3}$.

$$\begin{array}{ll} 4\frac{1}{4} & \\ 2\frac{2}{3} & \\ \hline 8 & (2 \text{ by } 4) \\ \frac{1}{2} & (2 \text{ by } \frac{1}{4}) \\ 2\frac{2}{3} & (\frac{2}{3} \text{ by } 4) \\ \frac{1}{6} & (\frac{2}{3} \text{ by } \frac{1}{4}) \\ \hline 11\frac{1}{3} & \end{array}$$

EXAMPLES.

1.	$2\frac{1}{2}$ by $1\frac{3}{4}$.	*6.*	$3\frac{5}{8}$ by $8\frac{1}{6}$.
2.	$3\frac{5}{6}$ by $4\frac{1}{3}$.	*7.*	$4\frac{9}{16}$ by $7\frac{1}{2}$.
3.	$2\frac{7}{8}$ by $7\frac{3}{16}$.	*8.*	$4\frac{1}{2}$ by $3\frac{1}{3}$.
4.	$5\frac{3}{10}$ by $4\frac{1}{5}$.	*9.*	$2\frac{1}{2}$ by $5\frac{5}{7}$.
5.	$8\frac{3}{14}$ by $2\frac{1}{6}$.	*10.*	$3\frac{3}{4}$ by $1\frac{3}{5}$.

24. To divide a fraction by a fraction.

RULE. — *Invert the divisor and proceed as in multiplication.*

ILLUSTRATIVE EXAMPLE.

Divide $\frac{2}{3}$ by $\frac{5}{7}$.

$$\tfrac{2}{3} \div \tfrac{5}{7} = \tfrac{2}{3} \text{ by } \tfrac{7}{5} = \tfrac{14}{15}.$$

EXAMPLES.

1.	$\frac{3}{4} \div \frac{2}{3}$.	*6.*	$\frac{1}{3} \div \frac{1}{6}$.
2.	$\frac{5}{7} \div \frac{3}{8}$.	*7.*	$\frac{5}{17} \div \frac{5}{7}$.
3.	$\frac{4}{5} \div \frac{2}{9}$.	*8.*	$\frac{5}{16} \div \frac{2}{16}$.
4.	$\frac{5}{11} \div \frac{5}{7}$.	*9.*	$\frac{15}{32} \div \frac{3}{32}$.
5.	$\frac{6}{13} \div \frac{5}{12}$.	*10.*	$\frac{7}{18} \div \frac{7}{15}$.

25. To divide a fraction by a whole number, or a whole number by a fraction.

ILLUSTRATIVE EXAMPLES.

Divide $\frac{5}{8}$ by 3.

$$\frac{5}{8} \div 3 = \frac{5}{8} \div \frac{3}{1} = \frac{5}{8} \text{ by } \frac{1}{3} = \frac{5}{24}$$

Divide 6 by $\frac{3}{10}$.

$$6 \div \frac{3}{10} = 6 \text{ by } \frac{10}{3} = \frac{60}{3} = 20$$

EXAMPLES.

1.	$\frac{3}{8} \div 5$.	*6.*	$8 \div \frac{2}{3}$.
2.	$\frac{4}{9} \div 2$.	*7.*	$7 \div \frac{4}{5}$.
3.	$\frac{8}{15} \div 4$.	*8.*	$16 \div \frac{2}{7}$.
4.	$\frac{9}{17} \div 6$.	*9.*	$15 \div \frac{5}{9}$.
5.	$\frac{8}{15} \div 3$.	*10.*	$20 \div \frac{15}{24}$.

26. To divide a mixed number by a whole number, or a whole number by a mixed number.

ILLUSTRATIVE EXAMPLES.

Divide $2\frac{1}{3}$ by 4.

$$2\frac{1}{3} \div 4 = \frac{7}{3} \div \frac{4}{1} = \frac{7}{3} \text{ by } \frac{1}{4} = \frac{7}{12}.$$

Divide 5 by $3\frac{1}{4}$.

$$5 \div 3\frac{1}{4} = 5 \div \frac{13}{4} = 5 \text{ by } \frac{4}{13} = \frac{20}{13} = 1\frac{7}{13}.$$

EXAMPLES.

1.	$4 \div 3\frac{1}{8}$.	*6.*	$4\frac{1}{2} \div 2$.
2.	$6 \div 2\frac{1}{2}$.	*7.*	$5\frac{1}{4} \div 3$.
3.	$9 \div 3\frac{1}{3}$.	*8.*	$6\frac{1}{8} \div 7$.
4.	$7 \div 3\frac{1}{2}$.	*9.*	$5\frac{5}{8} \div 15$.
5.	$8 \div 2\frac{1}{4}$.	*10.*	$16\frac{1}{4} \div 13$.

27. To divide a mixed number by a mixed number.

ILLUSTRATIVE EXAMPLE.

Divide $2\frac{1}{2}$ by $3\frac{1}{4}$.

$$2\tfrac{1}{2} \div 3\tfrac{1}{4} = \tfrac{5}{2} \div \tfrac{13}{4} = \tfrac{5}{2} \text{ by } \tfrac{4}{13} = \tfrac{20}{26} = \tfrac{10}{13}.$$

EXAMPLES.

1.	$4\frac{1}{2} \div 2\frac{1}{4}$.	*6.*	$15\frac{5}{16} \div 12\frac{1}{2}$.
2.	$5\frac{1}{4} \div 2\frac{5}{8}$.	*7.*	$13\frac{1}{3} \div 1\frac{1}{4}$.
3.	$4\frac{1}{5} \div 3\frac{1}{3}$.	*8.*	$12\frac{1}{2} \div 3\frac{1}{3}$.
4.	$6\frac{5}{7} \div 7\frac{1}{2}$.	*9.*	$17\frac{7}{8} \div 14\frac{5}{14}$.
5.	$4\frac{5}{8} \div 2\frac{3}{8}$.	*10.*	$20\frac{5}{21} \div 3\frac{5}{7}$.

DECIMAL FRACTIONS.

28. A DECIMAL FRACTION is a fraction whose denominator is 10 or some power of 10.

$$\tfrac{3}{10},\ \tfrac{3}{100},\ \tfrac{3}{1000},\ \tfrac{3}{10000}.$$

These fractions can be written in another form.

$$\tfrac{3}{10} = .3$$
$$\tfrac{3}{100} = .03$$
$$\tfrac{3}{1000} = .003$$
$$\tfrac{3}{10000} = .0003$$

.3, .03, .003, and .0003 are called decimals. The points prefixed are decimal points because they are followed by as many figures as the power of 10 expressed by the denominator.

ILLUSTRATIVE EXAMPLES.

Write as decimals $\frac{4}{10}$, $\frac{15}{1000}$, $17\frac{13}{10000}$.

$$\tfrac{4}{10} = .4$$
$$\tfrac{15}{1000} = .015$$
$$17\tfrac{13}{10000} = 17.0013$$

EXAMPLES.

Write as decimals:

1.	$\frac{13}{100}$.	*6.*	$2\frac{5}{10}$.
2.	$\frac{173}{1000}$.	*7.*	$13\frac{25}{100}$.
3.	$\frac{21}{10000}$.	*8.*	$16\frac{18}{1000}$.
4.	$\frac{153}{1000}$.	*9.*	$24\frac{17}{10000}$.
5.	$\frac{13}{1000000}$.	*10.*	$72\frac{19}{1000}$.

REMARK. — Every figure to the right of the decimal point is called a decimal place.

29. To change a decimal to a fraction.

RULE. — *Write as the denominator of the fraction 1 with as many ciphers annexed as there are decimal places. Omit the point and prefixed ciphers and write the remaining figures of the decimal as the numerator. Reduce this fraction to its lowest terms.*

ILLUSTRATIVE EXAMPLE.

Change .144 to a fraction.

$$.144 = \frac{144}{1000} = \frac{36}{250} = \frac{18}{125}.$$

EXAMPLES.

1.	.5	*6.*	1.3
2.	.012	*7.*	3.015
3.	.15	*8.*	14.0004
4.	.013	*9.*	12.525
5.	.0016	*10.*	27.0042

30. To change a fraction to a decimal.

RULE. — *Annex four ciphers to the numerator and divide by the denominator. Point off as many places in the quotient as are equal to the ciphers used.*

ILLUSTRATIVE EXAMPLE.

Change $\frac{3}{7}$ to a decimal.

$$
\begin{array}{r}
.4285\frac{5}{7} \\
7)3.0000 \\
\underline{28} \\
20 \\
\underline{14} \\
60 \\
\underline{56} \\
40 \\
\underline{35} \\
5
\end{array}
$$

.4286 *Ans.*

EXAMPLES.

1.	$\frac{3}{4}$.	*6.*	$\frac{7}{15}$.
2.	$\frac{7}{8}$.	*7.*	$\frac{17}{22}$.
3.	$\frac{2}{3}$.	*8.*	$\frac{12}{25}$.
4.	$\frac{5}{14}$.	*9.*	$\frac{4}{5}$.
5.	$\frac{6}{13}$.	*10.*	$\frac{21}{100}$.

31. To add decimals.

RULE. — *Write the decimals so that the points are in the same vertical line.*

Add as in whole numbers.

Place the point in the sum in the same vertical line with the points in the decimals.

ILLUSTRATIVE EXAMPLE.

Add .3, .13, 4.075, and .0016.

$$
\begin{array}{r}
.3 \\
.13 \\
4.075 \\
.0016 \\
\hline
4.5066
\end{array}
$$

EXAMPLES.

1. .4, .5, .7, .1.

2. .13, .17, .24, .37.

3. .35, .6, .141, .08.

4. 7.012, .33, 4.7, .015.
5. .2346, 3.173, 4.851, .014.
6. 124., 2.8, 17.64, 19.271.
7. 27.31, 18.6, 9.405, 17.642.
8. 84., 96., 12.0024, .0058, .0006.
9. Change to decimals and add: $\frac{3}{8}$, $\frac{5}{6}$, $\frac{2}{3}$, $1\frac{3}{4}$, $64\frac{4}{7}$, $\frac{4}{13}$.
10. 3.13, $2.12\frac{1}{2}$, $37\frac{1}{2}$, 4.015, 3.17.

32. To subtract decimals.

RULE. — *Write the decimals so that the points are in the same vertical line.*

Subtract as in whole numbers.

Place the point in the remainder in the same vertical line with the points in the decimals.

ILLUSTRATIVE EXAMPLE.

Subtract 2.12 from 14.3.

$$\begin{array}{r} 14.30 \\ 2.12 \\ \hline 12.18 \end{array}$$

REMARK. — Adding ciphers to a decimal does not change its value.

EXAMPLES.

Subtract:

1. .4 from .9.
2. .6 from 4.3.
3. .17 from 16.9.
4. 2.0013 from 17.16.
5. 6.5 from 15.
6. 14.05 from 121.23.
7. 98.76 from 124.12.
8. 4.18 from 9.136.
9. .038 from 5.12.
10. 2.015 from 3.5.

33. To multiply decimals.

RULE. — *Multiply as in whole numbers.*

Point off so that the decimal places in the product are equal to the sum of the decimal places in the multiplier and multiplicand.

ILLUSTRATIVE EXAMPLE.

Multiply 12.832 by 1.16.

12.832	
1.16	
76992	
12832	
12832	
14.88512	14.8851 *Ans.*

EXAMPLES.

Multiply:

1.	.12 by .4.	*6.*	14.8 by 16.97.
2.	.016 by 7.1.	*7.*	81.35 by 14.
3.	.003 by .182.	*8.*	6.25 by .0625.
4.	8.75 by 4.617.	*9.*	7.32 by 1.001.
5.	85 by .0007.	*10.*	$14\frac{1}{2}$ by $.16\frac{1}{4}$.

DIVISION OF DECIMALS.

34. DIVISION is the reverse of multiplication. Therefore, processes in division should be the reverse of those in multiplication. As we *added* the decimal places in multiplication to get the number of places to point off in the product, so we *subtract* in division to get the number of places to point off in the quotient.

To divide by a decimal.

RULE. — *Divide as in whole numbers.*

Point off as many places in the quotient as the decimal places in the dividend exceed those in the divisor, or add as many ciphers to the quotient as the decimal places in the divisor exceed those in the dividend.

NOTE 1. — In practice it is not necessary to carry the division farther than the 4th decimal place. If the dividend does not contain figures enough to give this number of places, and the last figure in the dividend gives a remainder in dividing, annex ciphers to the dividend so as to continue the division, and consider the quotient figures arising from the use of these ciphers as so many decimal places in the quotient.

NOTE 2. — If the places in the dividend are less than those in the divisor annex enough ciphers to the dividend to make them equal. The quotient arising from the use of all these places will be a whole number. If there be a remainder now annex ciphers so as to continue the division. The quotient arising from the use of these ciphers will be decimal.

NOTE 3. — When the dividend is less than the divisor annex ciphers to the dividend in order to divide. The quotient in this case will be entirely decimal.

NOTE 4. — When the quotient contains less figures than the rule requires to be pointed off make up the lack by prefixing ciphers.

Divide 23 by .12$\frac{2}{3}$.

$$
\begin{array}{r}
181.5789 \\
.12\frac{2}{3}\overline{)23} \\
3 \quad 3 \\
\hline
.38\overline{)69.000000} \\
38 \\
\hline
310 \\
304 \\
\hline
60 \\
38 \\
\hline
220 \\
190 \\
\hline
300 \\
266 \\
\hline
340 \\
304 \\
\hline
360 \\
342 \\
\hline
18
\end{array}
$$

181.579 *Ans.*

EXAMPLES.

Divide

1. .8 by .2.
2. 1.25 by .25.
3. 6.72 by .7.
4. 21.3 by .005.
5. 29.7 by .17.
6. .56 by .14.
7. 9.72 by .0009.
8. 6.09 by 29.
9. 85 by $.16\frac{2}{3}$.
10. $83\frac{1}{3}$ by $.14\frac{2}{7}$.
11. 4.5 by .9.
12. .45 by .9.
13. .45 by .09.
14. 45 by .09.
15. 45 by .9.
16. .5 by .25.
17. 5 by .25.
18. 5 by 2.5.
19. 5 by 25.
20. .05 by 25.
21. .05 by 2.5.
22. .05 by .25.
23. .005 by .25.
24. 50 by .25.
25. 50 by 2.5.
26. 500 by .025.
27. 2300 by .23.
28. 2300 by 23.
29. .23 by 2300.
30. .23 by 23.
31. 2.3 by 2300.
32. 9.45 by 15.
33. 112.8 by 1.864.
34. 5.375 by .0125.
35. 1.48 by 244.
36. .975 by 3.945.
37. 764.3 by 40.659.
38. 684.52 by 33.3.
39. $296.87\frac{1}{2}$ by $1.015\frac{2}{3}$.
40. 1284.37 by 1.0205.

MISCELLANEOUS PROBLEMS IN FRACTIONS AND DECIMALS.

35. *1.* Sold 4 pieces of carpet. The first contained $31\frac{1}{4}$ yds., the second $37\frac{5}{8}$ yds., the third $49\frac{7}{16}$ yds., and the fourth $44\frac{1}{2}$ yds. How many yards were sold in all?

2. A grocer packed in a box for shipment $15\frac{5}{8}$ lbs. sugar, $19\frac{3}{4}$ lbs. coffee, $2\frac{5}{16}$ lbs. tea, $17\frac{3}{8}$ lbs. ham, and $25\frac{1}{2}$ lbs. bacon. What was the total weight of the contents of the box?

3. I bought 4 bbls. of sugar, the net weight of each being respectively $275\frac{5}{8}$ lbs., $285\frac{3}{4}$ lbs., $291\frac{1}{2}$ lbs., and $269\frac{7}{16}$ lbs. What was the total net weight?

4. A man inherited $\frac{5}{17}$ of an estate in his own right, and bought the shares of two fellow-legatees who had inherited

respectively $\frac{11}{51}$ and $\frac{7}{84}$ of the same estate. What part of the estate did he then own?

5. A lady purchased the following goods: $5\frac{3}{4}$ yds. of ribbon for $\$\frac{5}{8}$, $1\frac{3}{4}$ yds. of lace for $\$3\frac{1}{2}$, and $5\frac{1}{2}$ yds. of silk for $\$15\frac{3}{16}$. How many yards did she purchase, and how much money did she spend?

6. Bought $\frac{7}{8}$ of a vessel, then sold $\frac{5}{16}$. How much do I now own?

7. A farmer bought a cow for $\$60\frac{3}{4}$ and a ton of hay for $\$17\frac{1}{3}$. How much change should he receive out of a \$100 note?

8. Paid $\$33\frac{1}{3}$ for taxes, and $\$125\frac{3}{4}$ for one month's rent. How much will I have left out of four \$50 bills?

9. If I pay $\$7\frac{7}{8}$ for a barrel of flour, and $\$1\frac{1}{4}$ for some eggs, how much less than \$10 is the whole cost?

10. If $3\frac{1}{2}$ bushels of apples cost $\$2\frac{3}{4}$, what will be the cost of $\frac{3}{4}$ of $3\frac{1}{2}$ bushels?

11. If $\frac{3}{4}$ of a pound of tea cost $\$\frac{1}{2}$, what is the cost of $3\frac{1}{2}$ times as much?

12. What is the value of $12\frac{3}{4}$ cords of wood at $\$6\frac{1}{2}$ a cord?

13. If a pound of coffee is worth $\$\frac{3}{8}$, what is the value of $176\frac{3}{5}$ lbs.?

14. What will $19\frac{9}{12}$ dozen eggs cost at $37\frac{1}{2}$ cts. per dozen?

15. If $4\frac{1}{2}$ tons of hay cost $\$32\frac{1}{2}$, what is the value of 170 tons at the same rate?

16. What is the cost of $25\frac{1}{2}$ acres of land at the rate of \$750 for $11\frac{2}{3}$ acres?

17. If a man can walk $15\frac{3}{4}$ miles in $3\frac{1}{2}$ hours, how long will it take him to walk $38\frac{3}{4}$ miles at the same rate?

18. What is the cost of $114\frac{1}{2}$ lbs. of coffee, if $\frac{1}{2}$ of $\frac{3}{4}$ of $12\frac{1}{2}$ lbs. cost 85 cts.?

19. What is the cost of 12 bbls. of flour, if $\frac{1}{2}$ of $\frac{2}{3}$ of 24 bbls. cost \$62?

20. Bought 50 lbs. of nails at $6\frac{1}{4}$ cts. a pound; 15 bolts at $12\frac{1}{2}$ cts. a piece; and 3 dozen screws for $37\frac{1}{2}$ cts. What was the amount of my bill?

21. Bought some coffee for $\$55\frac{3}{16}$, and sold it for $\frac{1}{2}$ of its cost, thus losing $9\frac{3}{4}$ cts. a pound. How many pounds did I buy?

22. What is the cost of $14\frac{2}{5}$ yds. of cloth if $36\frac{4}{7}$ yds. cost $\$11\frac{6}{7}$?

23. If $17\frac{1}{2}$ bushels of apples cost $\$9\frac{3}{4}$, how many bushels can be purchased for $\$23\frac{1}{2}$?

24. A owes B $\$30.28\frac{1}{8}$, and pays it in $32\frac{1}{4}$ yds. of dress goods at $82\frac{1}{2}$ cts. a yard, and the remainder in calico at $5\frac{1}{4}$ cts. a yard. How many yards of calico should B receive?

25. A farmer's yield of potatoes averaged 98.94 bushels per acre, of oats, 34.65 bushels per acre, and of wheat 13.65 bushels per acre. If 110 acres were planted in potatoes, 252 acres in oats, and 17.8 acres in wheat, what was the total number of bushels harvested?

26. A grocer buys 4 bags of coffee which average 132.08 lbs. each. If 3 of the bags weigh respectively 128.05, 131.75, and 134.15 lbs., what is the weight of the fourth bag?

27. If .34 of a barrel of vinegar cost $3.06, what will 5.3 bbls. cost?

28. A dealer in produce bought 4 wagonloads of wheat, containing respectively 30.015, 31.5, 29.05, and $33\frac{3}{14}$ bushels. What was the total cost at $\$1\frac{3}{8}$ per bushel?

29. From the sum of $.16\frac{2}{3}$, $3\frac{3}{4}$, 9.236, $8\frac{1}{16}$, and $11.11\frac{1}{9}$ take the difference between $24.62\frac{1}{4}$ and $13\frac{7}{8}$.

30. A manufacturer finds that the cost of the raw material for a dozen gloves is $\$9\frac{3}{4}$. To this he adds $\frac{1}{8}$ of the cost for manufacturing expenses, $\frac{1}{25}$ of the cost for interest, $1\frac{3}{75}$ for boxing and $\frac{1}{5}$ for the profit. If the cutting and the making, which cost $\$3.90\frac{5}{8}$, be added, what is the selling price?

31. Sold a lumberman 384.25 lbs. of butter, at \$.2875 per pound; 2468 lbs. of cheese at \$.115 per pound; and 2356.5 lbs. of dressed beef at \$.07$\frac{7}{8}$ per pound and received pay in lumber at \$23.125 M. How many thousand feet of lumber should he receive?

32. Find the sum of $8\frac{3}{5}$, $5\frac{2}{3}$ and $\frac{5}{12}$. Express the result both as a fraction in lowest terms and as a decimal.

33. A grocer sold goods to the value of \$525, using $15\frac{3}{4}$ oz. to the pound, and also received \$625 for goods sold using $16\frac{1}{4}$ oz. to the pound. How much did he gain or lose by using false weights?

34. A man bought a farm and paid $\frac{3}{7}$ of the purchase money in cash, and gave his note for the balance, secured by mortgage, for \$5391. How much did he pay in cash?

35. If a miller charges $\frac{1}{8}$ of a grist for toll, how much corn must I carry to his mill to entitle me to receive 394 pounds of corn meal?

36. A house and lot cost \$8000, and the house cost $\frac{2}{5}$ more than the lot. What was the cost of each?

37. A man owed \$9061, and paid \$8364. What fractional part of the debt did he still owe?

38. What fraction of $(5\frac{8}{9} - 3\frac{1}{4})$ of 3 tons 16 cwts. 3 qrs. $22\frac{2}{5}$ lbs. is $7\frac{3}{5}$ of $\frac{3\frac{3}{4}}{3\frac{17}{19}}$ of 5 cwts. 3 qrs. $3\frac{1}{2}$ lbs.?

39. A uniform bar of steel weighs 3 qrs. 15 lbs. $13\frac{3}{4}$ oz.; what part must be cut off to make the bar weigh 58 lbs. $4\frac{5}{9}$ oz.?

40. Find the value of a ton and a third of sugar, when $\frac{3}{16}$ of a ton is worth \$22.50.

41. A man's debts amount to $\frac{1}{14}$ of his property, but before paying them he loses $\frac{7}{8}$ of his property; afterwards he recovers a portion equal to $\frac{1}{5}$ of what he has left, and then loses $\frac{1}{2}$ of what he has got. What part of his property remains over?

INTEREST.

36. INTEREST is money paid for the use of money, and is reckoned at a certain per cent. for each year.

37. The PRINCIPAL is the sum on which interest is paid.

38. The RATE is the per cent. paid each year.

39. The AMOUNT is the sum of principal and interest.

40. LEGAL INTEREST is the rate of interest fixed by law. In Massachusetts the legal rate is 6%.

41. SIMPLE INTEREST is interest reckoned on the principal only.

42. COMPOUND INTEREST is computed not only on the principal, but also on the interest as it becomes due.

COMPUTING TIME.

43. The following method for computing time is used:

ILLUSTRATION. — Find the time between March 16, 1907, and Nov. 13, 1908.

From March 16, 1907, to March 16, 1908 = 1 year.
From March 16, 1908, to Oct. 16, 1908 = 7 mos.
From Oct. 16, 1908, to Nov. 13, 1908 = 28 days.

NOTE.— Centennial years that are divisible by 400 and other years that are divisible by 4 are leap years.

The pupil should obtain these results mentally, and for practice will get the answers and perform the following questions in the way described above:

Find the time between

1. June 28, 1906, and March 24, 1908.
2. July 12, 1907, and Sept. 30, 1909.
3. Aug. 16, 1906, and Feb. 28, 1907.
4. Sept. 29, 1907, and Oct. 3, 1908.
5. Jan. 30, 1906, and March 1, 1908.
6. Dec. 31, 1908, and Feb. 28, 1909.
7. Jan. 29, 1909, and Feb. 28, 1911.
8. Oct. 28, 1907, and March 2, 1909.
9. Nov. 15, 1906, and Nov. 16, 1910.
10. April 26, 1908, and April 28, 1909.
11. March 31, 1906, and Sept. 30, 1907.
12. May 12, 1907, and June 8, 1912.
13. Jan. 21, 1906, and April 28, 1913
14. Dec. 17, 1907, and Jan. 16, 1910.
15. Sept. 12, 1906, and Dec. 26, 1909.
16. April 1, 1906, and Nov. 25, 1912.
17. Aug. 22, 1906, and Feb. 26, 1911.
18. July 28, 1907, and March 18, 1908.
19. May 21, 1908, and Aug. 26, 1914.
20. Nov. 23, 1908, and July 31, 1909.
21. July 2, 1907, and Aug. 1, 1907.
22. Feb. 26, 1908, and March 25, 1908.
23. Dec. 4, 1907, and March 16, 1908.
24. March 30, 1908, and April 29, 1908.
25. May 6, 1907, and June 4, 1907.
26. Feb. 28, 1908, and March 27, 1908.
27. June 3, 1908, and July 2, 1908.
28. Feb. 29, 1908, and March 21, 1908.
29. Oct. 10, 1907, and Nov. 9, 1907.
30. Feb. 28, 1909, and March 31, 1909.
31. Sept. 3, 1907, to Nov. 3, 1907.
32. Oct. 31, 1907, to March 2, 1908.
33. Nov. 16, 1907, to Dec. 21, 1909.
34. Dec. 29, 1907, to April 30, 1910.
35. Nov. 28, 1907, to July 13, 1909.
36. Feb. 28, 1908, to Feb. 29, 1912.

37. Feb. 29, 1908, to Feb. 28, 1909.
38. Aug. 18, 1908, to May 19, 1910.
39. July 20, 1908, to July 21, 1911.
40. March 31, 1909, to Nov. 30, 1910.
41. June 30, 1908, to June 29, 1913.
42. Jan. 1, 1908, to Feb. 2, 1912.
43. April 4, 1909, to April 3, 1910.
44. June 3, 1908, to July 31, 1909.
45. Feb. 29, 1908, to Nov. 30, 1915.
46. Oct. 25, 1909, to Nov. 27, 1910.
47. Sept. 3, 1907, to Oct. 5, 1909.
48. May 25, 1908, to June 23, 1909.
49. June 3, 1908, to June 18, 1910.
50. Sept. 7, 1907, to Nov. 15, 1907.
51. July 28, 1909, to Aug. 3, 1910.
52. Nov. 15, 1908, to Jan. 5, 1910.
53. Dec. 8, 1907, to Dec. 4, 1908.
54. April 1, 1908, to May 20, 1909.
55. May 30, 1907, to Sept. 4, 1910.
56. April 28, 1906, to June 4, 1908.

SIX PER CENT. METHOD.

44. The interest on one dollar for one year is \$.06; at this rate one dollar produces \$.01 interest every two months; therefore the following rules may be used:

RULE FOR MONTHS. — *To find the interest for* **two months or 60 days** *on any sum, move the decimal point* two *places to the left.*

The interest on \$1.00 for 60 days being \$.01, it follows that the interest on \$1.00 for 6 days will be $\frac{1}{10}$ of that for 60 days or \$.001.

RULE FOR DAYS. — *To find the interest for* **six days** *on any sum, move the decimal point* three *places to the left.*

SHORT CUTS FOR RECKONING SIMPLE INTEREST.

The interest on the principal for 200 months = principal.

" " " " " " 50 " = $\frac{1}{4}$ of principal.
" " " " " " 40 " = $\frac{1}{5}$ " "
" " " " " " 25 " = $\frac{1}{8}$ " "
" " " " " " 20 " = $\frac{1}{10}$ " "
" " " " " " 10 " = $\frac{1}{2}$ of 20 mos.
" " " " " " 5 " = $\frac{1}{4}$ " "
" " " " " " 30 days = $\frac{1}{2}$ " 2 "
" " " " " " 20 " = $\frac{1}{3}$ " "
" " " " " " 15 " = $\frac{1}{4}$ " "
" " " " " " 12 " = $\frac{1}{5}$ " "
" " " " " " 10 " = $\frac{1}{6}$ " "
" " " " " " 3 " = $\frac{1}{2}$ " 6 days.
" " " " " " 2 " = $\frac{1}{3}$ " "
" " " " " " 1 " = $\frac{1}{6}$ " "

The interest for 600 days = 20 mos. or $\frac{1}{10}$ of principal.

" " " 500 " = $\frac{5}{6}$ of 600 days or $\frac{1}{12}$ of principal.
" " " 450 " = $\frac{3}{4}$ of 600 " or $\frac{3}{40}$ " "
" " " 300 " = $\frac{1}{2}$ of 600 " or $\frac{1}{20}$ " "
" " " 200 " = $\frac{1}{3}$ of 600 " or $\frac{1}{30}$ " "
" " " 150 " = $\frac{1}{4}$ of 600 " or $\frac{1}{40}$ " "
" " " 100 " = $\frac{1}{6}$ of 600 " or $\frac{1}{60}$ " "

By using the above table the pupil will save considerable time and labor in making computations.

The following examples *must* be done according to the preceding rules, after changing the years to months:

ILLUSTRATION. — Find the interest on $476.15 for 1 yr. 9 mos. 16 days. Reduce the 1 yr. and 9 mos. to months, which equal 21 months.

Amt.	Prin.	Int.	Rate.	Time.
	$476.15		6	1 yr. 9 mos. 16 days.

47.615 interest for 20 mos., 10 times 2 mos., or $\frac{1}{10}$ of principal.
2.3807 " " 1 mo., $\frac{1}{2}$ of 2 mos.
.7936 " " 10 days, $\frac{1}{3}$ of 1 mo.
.4761 " " 6 " (Rule for Days, page 36).
51.2654 " " 21 mos. 16 days.

1. $750.30 for 2 mos.
2. $618.00 for 9 mos.
3. $1715.13 for 2 yrs.
4. $1450.16 for 3 yrs. 0 mos. 25 days.
5. $3618.10 for 4 yrs. 6 mos. 26 days.
6. $715.50 for 4 yrs. 4 mos. 29 days.
7. $1202.02 for 1 yr. 1 mo. 0 days.
8. $1965.45 for 1 yr. 7 mos. 1 day.
9. $6715.90 for 2 yrs. 8 mos. 10 days.
10. $5005.50 for 3 yrs. 6 mos. 20 days.
11. $324.12 for 2 yrs. 4 mos. 15 days.
12. $819.16 for 9 mos. 16 days.
13. $1214.17 for 1 yr. 8 mos. 29 days.
14. $555.55 for 2 yrs. 7 mos. 19 days.
15. $1742.25 for 5 yrs. 6 mos. 5 days.
16. $1.75 for 1 yr. 6 mos. 9 days.
17. $6.15 for 1 yr. 9 mos. 12 days.
18. $476.75 for 5 yrs. 9 mos. 13 days.
19. $892.65 for 3 yrs. 9 mos. 30 days.
20. $1317.45 for 1 yr. 0 mos. 7 days.
21. $2746.67 for 3 yrs. 9 mos. 4 days.
22. $843.72 for 4 yrs. 8 mos. 22 days.
23. $6412.81 for 5 yrs. 5 mos. 28 days.
24. $4516.00 for 4 yrs. 10 mos. 11 days.
25. $1200.12 for 6 yrs. 7 mos. 25 days.

26. $909.09 from July 26, 1907, to Feb. 21, 1909.
27. $1111.11 from Feb. 29, 1908, to Aug. 28, 1908.
28. $5640.15 from Oct. 14, 1884, to Oct. 12, 1907.
29. $7500.00 from June 20, 1902, to Feb. 24, 1907.
30. $10000.00 from May 11, 1905, to Nov. 6, 1908.
31. $140.16 from Aug. 17, 1907, to June 14, 1908.
32. $972.24 from July 12, 1907, to March 2, 1912.
33. $358.16 from April 6, 1888, to June 9, 1907.
34. $567.42 from Aug. 14, 1900, to Oct. 16, 1907.
35. $1278.24 from April 21, 1902, to Nov. 18, 1909.
36. $950.00 from Jan. 24, 1906, to March 21, 1907.
37. $670.75 from Aug. 15, 1907, to July 13, 1908.
38. $694.87 from Feb. 28, 1906, to Dec. 29, 1909.
39. $1400.00 from April 17, 1907, to March 16, 1908.
40. $510.40 from Jan. 4, 1908, to July 3, 1908.
41. $300.83 from Sept. 16, 1907, to June 14, 1910.
42. $1025.59 from Aug. 6, 1908, to Dec. 29, 1913.
43. $643.24 from April 7, 1908, to Aug. 6, 1914.
44. $492.87 from June 3, 1909, to Oct. 12, 1913.
45. $1155.50 from Aug. 9, 1910, to March 27, 1917.
46. Find the total interest for the following:

$620 for 18 days.
$165 for 21 days.
$890 for 27 days.
$95 for 15 days.
$21 for 9 days.
$188 for 11 days.
$289 for 16 days.
$456 for 3 days.
$640 for 20 days.

47. Find the total interest for the following:

$1240.50 for 1 yr. 6 mos. 6 days.
$6824.67 for 2 yrs. 9 mos. 18 days.
$186.95 for 8 mos. 20 days.
$486.75 for 3 yrs. 7 mos. 21 days.
$94.25 for 5 yrs. 11 mos. 29 days.
$108.60 for 12 yrs. 6 mos. 27 days.

48. Find the total interest for the following:

$800.50 for 3 yrs. 1 mo. 3 days.
$89.60 for 2 yrs. 3 mos. 15 days.
$400.00 for 5 yrs. 5 mos. 19 days.
$14.60 for 9 mos. 7 days.

45. To find interest at any other rate than 6%, first find it at 6%, then take such part of it as the rate is of 6%.

Note. — If the interest is required at 1%, divide by 6; at 1½%, divide by 4; at 2%, divide by 3; at 3%, divide by 2; at 4%, divide by 3 and subtract; at 4½, subtract ¼; at 5, subtract ⅓; at 5½, subtract $\frac{1}{12}$; at 6½, add $\frac{1}{12}$; at 7, add ⅓; at 7½, add ¼; at 8, add ⅓; at 9, add ½; at 10, divide by 6 and move the decimal point one place to the right.

Find the amount of:

1. $37.50 for 26 days at 8%. At 4%.

2. $118.65 for 1 yr. 16 days at 4½%. At 7½%.

3. $1265.75 for 2 yrs. 5 mos. 17 days at 1½%. At 6½%.

4. $1856.00 for 3 yrs. 6 mos. 12 days at 3%. At 2% per month.

5. $1713.25 for 4 yrs. 5 mos. 29 days at 9%.

6. $2415.94 from Jan. 24, 1908, to Dec. 16, 1909, at 5%. At 7%.

7. $1569.74 from Oct. 28, 1907, to Aug. 17, 1912, at 10%. At 3½%.

8. $1876.25 from May 16, 1909, to March 27, 1911, at 1½%. At 9%.

9. $972.16 from June 24, 1908, to Sept. 13, 1913, at 7%. At 5%.

10. $4455.66 from Jan. 11, 1906, to Jan. 10, 1908, at 2½%. At 8½%.

11. $1500.19 from March 16, 1908, to July 3, 1911, at 1½%. At 1¾%.

12. $2467.11 from Dec. 25, 1907, to Sept. 23,1913, at 10%. At 12%.

Note 1. — ½% per month is the same as 6% per year.
1% per month is the same as 12% per year.
¾% per month is the same as 9% per year.

Note 2. — Multiply the rate per month by 12 and it will give the rate per year.

To find the interest on the Average Investment.

Figure the interest at the given rate on each item, both on the debit and credit sides of the account, from the date it is entered in the account to the date on which the interest is to be credited. From the sum of the interest on the credit side subtract the sum of the interest on the debit side and result will be the interest on the average investment.

46. *1.* What interest should be allowed on the following partner's account, Jan. 1, 1908, at 7½%?

Dr. H. W. COLBY. *Cr.*

1907.				1907.			
Oct. 1.	Sundries	$7860	00	Oct. 1.	Sundries	$12800	00
Nov. 16.	Cash	200	00	" 1.	Cash	3000	00
" 30.	"	182	50	Dec. 12.	"	1082	00
Dec. 12.	N. Pay.	500	00	" 21.	N. Rec.	4300	00

2. H. L. Clark and J. B. Geddes enter into partnership Jan. 1. It is agreed that each partner shall receive interest on his average investment at the rate of 7% per annum. Clark invests, Jan. 1, $7000. On Jan. 14, he withdraws $500; and on Jan. 25 he makes an additional investment of $1000. Geddes invests, Jan. 1, $2000; Jan. 16, $1000; and on Jan. 20 he withdraws for private use $600. For what amount of interest should each partner be credited at close of business, Jan. 31?

3. The partners in a grocery business are allowed interest at 6% on all investments and charged at the same rate on all withdrawals. What balance of capital and interest is due Partner A, Dec. 31, 1907, who invested $2700 Feb. 16, 1907, and withdrew $400 June 16, and $1200 Sept. 28?

4. Jan. 1, A. Jones and T. Cook enter into partnership under the agreement that each should be allowed 6% interest on all investments and charged same on withdrawals. Jones invested cash, $2000, merchandise, $1500; A. Cook's account, $325. Cook invested $3000 cash, store valued at $2000. Jan. 8, Jones made an additional investment of

$1000. Jan. 15, Cook withdrew $500. Jan. 18, Cook made an additional investment of $400. Jan. 20, Jones withdrew $300. How much interest should each man be credited with Jan. 31?

5. A. F. Field and W. H. Lothrop enter into partnership March 1, 1907, investing $4000 each, interest to be credited at end of each month to partners on investment and interest charged on all money withdrawn on private account; each man to be paid a salary of $200 per month. March 15, the firm pays a bill for Mr. Lothrop of $149, and one for Mr. Field of $162. March 30, they are paid their salary of $200 each. April 1, Mr. Lothrop invests $1000 and Mr. Field $1500. April 20, Mr. Field draws $129. April 25, Mr. Lothrop draws $134. Salaries are paid in cash for April and May. How much is due each partner June 1, 1907, on his investment exclusive of losses or gains?

6. June 1, A. W. Hatch and A. E. Haskell began business under the agreement that each should be allowed 6% interest on all of his investments and charged 8% on amounts withdrawn. A. W. Hatch invested cash $3000, teams, etc., $1275. A. E. Haskell invested cash $2500, store, fixtures, etc., valued at $2000. June 5, A. W. Hatch withdrew for private use $125. June 7, A. E. Haskell withdrew for private use $210. June 9, A. W. Hatch made an additional investment of $1500. June 15, the book-keeper paid a private bill for A. W. Hatch, $75.76. How much interest would be credited to each partner at the closing of the business on June 30?

7. On Jan. 1, a broker borrowed from Bank, $225000, at 12%; Jan. 4, rate dropped to 10%; Jan. 8, rate dropped to 8%; Jan. 15, rate dropped to 7%; Jan. 22, rate dropped to 6%; Jan. 9, paid $50000; Jan. 14, paid $50000; Jan. 16, paid $50000; Jan. 23, paid $50000; Jan. 24, paid $25000 and interest due. Required — amount of interest.

ACCURATE INTEREST.

47. Accurate Interest is the interest for any part of the year computed for the exact number of days, and the result diminished by $\frac{1}{73}$ of itself. It is used in figuring interest on United States Bonds or on the money of foreign countries.

12 months of 30 days each or 360 days have been considered a year in the foregoing examples. Since a year, exclusive of leap year, contains 365 days, 360 days is $\frac{5}{365}$ or $\frac{1}{73}$ too short. It is obvious, therefore, that five days more interest has been obtained than is rightfully due.

To compute Accurate Interest.

RULE. — *Count the entire years, and for any fractional part of a year take the exact days. Get the interest on the principal for these exact days by the ordinary process, and from it deduct $\frac{1}{73}$ of itself. To the remainder add the ordinary interest on the principal for the entire years, if any, and the sum will be the Accurate Interest.*

ILLUSTRATION. — Find the accurate interest of $750.10 for 1 yr. 252 days at 6%.

45.0060 = int. for 1 yr.
31.0726 = " " 252 days.
76.0786 = *Ans.*

25.0033 = int. for 200 days.
6.2508 = " " 50 days.
.2500 = " " 2 days.
73)31.5041 = " " 252 days.
.4315 = $\frac{1}{73}$
31.0726 = accurate int.

NOTE. — English money should be changed to pounds and the decimal of a pound before computing the interest.

Divide the pence by 12 and to the result add the shillings. Divide the shillings and decimal of a shilling thus found by 20, and add the pounds.

Use this principal as in U. S. money.

To reduce your result to pounds, shillings and pence, reverse the above process. Multiply the decimal of a pound by 20 thus changing it to shillings and the decimal of a shilling. Multiply the decimal of a shilling by 12 to reduce to pence.

ILLUSTRATION. — Find the accurate interest of £342 6*s*. 7*d*. for 294 days at 4½%.

12) 7.0000
20) 6.5833
£342.3291 = Prin.

£12.4082
20
s.8.1640
12
d.1.9680

11.4109 = int. for 200 days at 6%.
3.4232 = " " 60 " " "
1.7116 = " " 30 " " "
.2282 = " " 4 " " "
4)16.7739 = " " 294 " " "
4.1934 = 1½%.
73)12.5805 = int. for 294 days at 4½%.
.1723 = $\frac{1}{73}$.
£12.4082 = accurate int. for 294 days at 4½%.

£12 8*s*. 1.9*d*. = *Ans*.

EXAMPLES IN ACCURATE INTEREST.

1. $1125.00 for 126 days at 6%.

2. $6666.75 for 342 days at 7%.

3. $33.45 for 1 yr. 73 days at 5%.

4. $48.50 from Aug. 6, 1907, to June 3, 1909, at 4½%.

5. $166.67 from Jan. 1, 1907, to Oct. 17, 1912, at 5%.

6. Four U.S. bonds of $500 each at 4% from June 16, 1907, to Aug. 12, 1907.

7. Two U.S. bonds of $1000 each at 6% from July 28, 1908, to Sept. 30, 1912.

8. One U.S. bond of $5000 at 3½% from Aug. 17, 1908, to March 16, 1909.

9. £642 6*s*. 7*d*. at 4½% from Aug. 13, 1908, to June 3, 1909.

10. £1238 9*s*. 11*d*. at 6% from May 7, 1908, to April 4, 1910.

11. £275 15*s*. 5*d*. at 5%, from Aug. 6, 1907, to Feb. 28, 1909.

12. £105 3*s*. 9*d*. at 5½% from Jan. 13, 1908, to Sept. 10, 1909.

13. £1240 17*s*. at 4½% from May 19, 1908, to Aug. 10, 1909.

14. £24 8*s*. 11*d*. at 5% from Dec. 28, 1908, to April 9, 1910.

15. £314 18*s.* 1*d.* at 4% from Aug. 12, 1907, to Oct. 7, 1909.

16. £97 1*s.* 10*d.* at 5½% from July 29, 1909, to Sept. 16, 1911.

PROBLEMS IN INTEREST.

48. There are four problems in interest:

I. *To find the Rate: the Principal, Time, and Interest or Amount being given.*

II. *To find the Time: the Principal, Rate, and Interest or Amount being given.*

III. *To find the Principal: the Interest, Rate, and Time being given.*

IV. *To find the Principal: the Amount, Rate, and Time being given.*

PROBLEM I.

49. To find the rate.

RULE. — *Divide the given interest by the interest of the given principal for the given time at 1%.*

NOTE. — The divisor must be absolutely correct.

ILLUSTRATION. — At what rate per cent. will $125.50 gain $17.57 in 2 yrs. and 4 mos.?

NOTE. — Make a statement as follows:

Amt.	Prin.	Int.	Rate.	Time.
	$125.50	$17.57	×	2 yrs. 4 mos.

12.5500 int. for 20 mos.
5.0200 " " 8 mos.
6)17.57 at 6%
2.928⅓ at 1%

2.928⅓)17.57
3
8.785)52.71(6% *Ans.*
52.71
0

At what rate per cent. will

1. $644 gain $254.38 in 6 yrs. 7 mos.?
2. $725 gain $341.355 in 9 yrs. 5 mos.?
3. $1250 amount to $1612.50 in 3 yrs. 7 mos. 15 days?

PROBLEM II.

50. To find the time.

RULE. — *Divide the given interest by the interest on the given principal for one year at the given rate. The entire part of the quotient will be years.*

Reduce the decimal part (if any) to months by multiplying by 12, and the decimal part of this product (if any) to days by multiplying by 30.

NOTE 1. — The divisor must be absolutely correct.

NOTE 2. — The division should be carried to the fourth place, and if there is ½ or over after multiplying by 30, it should be called another day.

ILLUSTRATION. — In what time will

$168.00 gain $24.72 interest at 7 %?

Amt.	Prin.	Int.	Rate.	Time.
	$168.00	$24.72	7	×

6)10.08 int. for 12 mos. at 6%.
1.68 " " 12 " " 1%.
11.76 " " 12 " " 7%.

11.76)24.72 (2.1020 2 yrs. 1 mo. 7 days. *Ans.*
23.52 12
1200 1.2240
1176 30
2400 6.7200
2352
480

In what time will

1. $1748.10 gain $450.15 at 6%?
2. $2415.73 gain $275.88 at 5%?
3. $3567.16 amount to $4117.10 at 9%?

PROBLEM III.

51. To find the principal: the interest, rate, and time being given.

RULE. — *Divide the given interest by the interest on one dollar for the given time and rate.*

NOTE. — The divisor must be absolutely correct.

ILLUSTRATION. — What principal will produce $364.15 interest in

1 yr. 7 mos. 18 days at 7%?

Amt.	Prin.	Int.	Rate.	Time.
	×	$364.15	7	1 yr. 7 mos. 18 days.

.095 for 19 mos.
.003 " 18 days.
.098 int. at 6%
.016⅓ " " 1%
.114⅓ " " 7%

.114⅓)364.15
3
.343)1092.45(3184.985
1029
634
343
2915
2744
1710
1372
3380
3087
2930
2744
1860
1715
145

What principal will produce

1. $515.25 interest in 2 yrs. 7 mos. 19 days at 8%.
2. $1450.75 interest in 6 yrs. 8 mos. 29 days at 7½%.
3. $125.35 interest in 0 yrs. 6 mos. 17 days at 5½%.

PROBLEM IV.

52. To find the principal: the amount, rate, and time being given.

RULE. — *Divide the given amount by the amount of one dollar for the given time at the given rate.*

NOTE. — The divisor must be absolutely correct.

ILLUSTRATION. — What principal will amount to

$1452.16 in 2 yrs. 5 mos. 17 days at 7½%?

Amt.	Prin.	Int.	Rate.	Time.
$1452.16	×		$7\frac{1}{2}$	2 yrs. 5 mos. 17 days.

.145 int. on $1 for 29 mos. at 6%.
.002$\frac{5}{6}$ " " " " 17 days at "
4).147$\frac{5}{8}$
.036$\frac{23}{24}$ " " " at $1\frac{1}{2}$%.
1.184$\frac{19}{24}$ amt. of $1 at $7\frac{1}{2}$% for 2 yrs. 5 mos. 17 days.

1.184$\frac{19}{24}$)1452.16
24
28.435)34851.84(1225.666
28435
64168
56870
72984
56870
161140
142175
189650
170610
190400

What principal will amount to —

1. $546.63 in 11 mos. 16 days at 6%?
2. $3768.45 in 2 yrs. 3 mos. 25 days at $4\frac{1}{2}$%?
3. $116.25 in 1 yr. 7 mos. 18 days at $5\frac{1}{2}$%?
4. $4646.46 in 3 yrs. 1 mo. 23 days at 8%?
5. $1270.14 in 4 mos. 24 days at $\frac{3}{4}$% per month?
6. $847.28 in 1 mo. 18 days at $\frac{1}{2}$% per month?
7. $5443.52 in 4 yrs. 5 mos. 7 days at $7\frac{1}{2}$%?

PARTIAL PAYMENTS.

53. A PARTIAL PAYMENT is a part payment of the amount of a promissory note, or other obligation, at the time such payment is made.

Part payments are usually acknowledged by indorsement on the back of the note, but sometimes by special receipts for the sums paid.

54. Various rules are in use for finding the balance due on a note on which part payments have been made. They are known as follows: United States Rule; New Hampshire Rule; Connecticut Rule; Vermont Rule, and the Merchants' Rule.

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55. MERCHANTS' RULE.

RULE. — *Find the amount of the principal from the date the note begins to bear interest to the date of full settlement.*

Find the amount of each payment from the date it was made to the date of full settlement. Add the amounts of the several payments and subtract the sum from the amount of the principal.

The difference will be the balance due on the note.

Compute the time in Partial Payments in years, months and days, and carry all interest computations four places.

56. UNITED STATES RULE.

RULE.—*1. Compute the interest on the principal to the date of the first payment and if the payment equals or exceeds the interest thus found, add the interest to the principal, and deduct the payment considering the remainder as a new principal.*

2. If the payment is smaller than the interest, compute the interest on the same principal from the date of the note to the date of the second payment, and if the sum of the two payments equals or exceeds the interest thus found, add the interest and deduct the sum of these two payments as in 1. If they do not, proceed in the same manner to the date of the third or such subsequent payment as the sum of the payments is sufficient to cancel the interest, and treat the remainder as a new principal.

3. In a similar manner find the interest of the new principal to the date of the next payment, and so continue to the date of settlement.

NOTE. — The Supreme Court, in its decision adopting the above rule, held that the payment should first be applied to cancel the interest; whatever balance, after paying the interest, should be used to diminish the principal. In case the payment is not large enough to cancel the interest, it fails of its object and must be treated as directed in the rule.

EXAMPLES.

The following examples will serve for practice by both rules:

NOTE. — As the other rules, viz., the New Hampshire, the Connecticut, and the Vermont rules, named at the beginning of this subject, are at best only local in their application, the two rules given, viz., the Merchants' and the United States, are sufficient for ordinary use.

EXAMPLES.

1. What balance is due Dec. 31, 1907, on a note for $1200 dated May 2, 1906, bearing interest at 6%, and having the following endorsements: July 1, 1906, $200; Oct. 30, 1906, $90; Feb. 28, 1907, $175; May 19, 1907, $500?

2. April 21, 1905, I gave my note for $3500, payable in 3 yrs. with 5½% interest. I have paid as follows: Oct. 19, 1905, $100; March 31, 1906, $100; July 20, 1906,

$950; Jan. 14, 1907, $640; May 1, 1907, $500; July 10, 1907, $800. How much did it require to cancel the note Sept. 1, 1907?

3. A note for $1600 on demand, with interest, dated March 16, 1907, had paid on it Sept. 3, 1907, $300, Nov. 18, 1907, $450, and Jan. 12, 1908, $255.10. How much was due at the end of one year, interest being at 6%?

4. Find the balance due at the end of two years on a note for $1250.17 given Nov. 9, 1907, endorsed as follows: May 1, 1908, $210.12; June 12, 1908, $175.84; Nov. 3, 1908, $255.55; Jan. 29, 1909, $500.

5. What is the value of a note Dec. 31, 1907, given with interest at 5%, June 4, 1904, for $3000, and on which has been paid, Oct. 17, 1904, $377.19; Dec. 13, 1904, $500; July 22, 1905, $816.13; Nov. 6, 1905, $300; and Feb. 15, 1907, $615.50?

6. $1280.10 BOSTON, MASS., June 4, 1906.

For value received, I promise to pay W. A. Brown, or order, twelve hundred eighty and $\frac{10}{100}$ dollars on demand, with interest at 7%. JOHN BARRETT.

Endorsements: Dec. 16, 1906, $350; Jan. 2, 1907, $240; Feb. 17, 1907, $390; March 14, 1907, $300. What was due May 13, 1907?

7. Find the value of a note for $2550, given Oct. 12, 1905, with interest at 4½%, and on which the following payments have been endorsed: Jan. 5, 1906, $825.00; June 19, 1906, $315.16; Oct. 12, 1906, $419.29; and Jan. 16, 1907, $367.84. Settlement being made Sept. 6, 1907.

8. Sold goods that cost $4516.75 at 20% gain and took a demand note in payment for the same.

This note was dated Jan. 16, 1907, and bore interest at 5%. It had the following endorsements: March 1, 1907, $999.25; June 18, 1907, $1000; Sept. 3, 1907, $500.00; Oct. 7, 1907, $333.45. What payment must be made Dec. 1, 1907, to settle the account?

9. I hold a note for $2550 dated Dec. 10, 1905, payable in 2 yrs. with 5% interest. The following payments have been made: July 3, 1906, $575; Nov. 22, 1906, $340; March 11, 1907, $75; Nov. 30, 1907, $50. What balance is due at maturity?

10. Find the amount due April 15, 1911, on a note of $4000, dated March 12, 1908. Interest at 6%. The following payments have been made: Sept. 12, 1908, $620; Feb. 18, 1909, $1441; Dec. 6, 1909, $50; Jan. 30, 1910, $1000.

11. On a note of $3800, dated Oct. 1, 1911, the following payments have been made: Dec. 31, 1911, $300; Feb. 29, 1912, $12; June 3, 1912, $600; Oct. 2, 1913, $800. What amount will be due me on Dec. 31, 1913?

12. Find what was due Feb. 25, 1911, on a note for $3000, dated March 12, 1909. The following payments have been made: Aug. 18, 1909, $325; April 9, 1910, $75; July 3, 1910, $400; Dec. 4, 1910, $150.

13. Find the amount due Feb. 25, 1911, on a note of $4000. The note was endorsed as follows: Aug. 18, 1909, $325; April 9, 1910, $75; July 3, 1910, $400; Dec. 4, 1910, $150. The date of the note was March 12, 1909.

14. Messrs. Blake Bros. loaned me $50000 July 23, 1907, on my demand note. July 25 and each day thereafter I paid $10000, till full settlement was made. If money was worth $5\frac{1}{2}$, how much interest did I pay with the last $10000 instalment?

15. A manufacturer borrowed $90000 at the Bank of the Republic on his demand note, and deposited as collateral security 10 U.S. bonds of $10000 each. The loan was made Sept. 10, 1907, and Sept. 14 the borrower paid $20000. Sept. 20 he paid $20000 more, and Sept. 30 $25000. Oct. 15 he withdrew his collaterals and took up the remainder

of his note. How much was the last payment, interest $4\frac{1}{2}\%$?

16. $172.15 BOSTON, July 15, 1900.

For value received, I promise to pay F. F. Lincoln, or order, on demand, one hundred seventy-two dollars and fifteen cents, with interest. CLAYTON FREEMAN.

Endorsements: Dec. 7, 1900, $19.17; Oct. 19, 1901, $27.16; Sept. 25, 1902, $35.12; July 10, 1903, $3.18; June 5, 1904, $33.33; Dec. 27, 1905, $30.17; May 4, 1906, $3.27; Sept. 2, 1907, $25.00. What was due Jan. 1, 1908?

17. Dec. 30, 1904, I gave my note for $6000, payable in 3 yrs. with interest at 5% after March 10, 1905. I have paid as follows: July 5, 1905, $700; Jan. 11, 1906, $100; April 1, 1906, $1150; Aug. 17, 1906, $500; Dec. 31, 1906, $1000; May 25, 1907, $2100; Sept. 5, 1907, $425. How large a note must I give at the bank Oct. 31, 1907, to get enough money to cancel the first note?

18. $3500.00. BOSTON, MASS., Sept. 3, 1905.

Three years after date, for value received, I promise to pay H. L. Kincaid, or order, three thousand and five hundred dollars, with interest at 6%. I. T. HATTERSLEY.

The following endorsements were made on the above note: Sept. 12, 1905, $350; May 9, 1906, $75; Oct. 8, 1906, $250; Jan. 18, 1907, $400; Aug. 5, 1907, $90; Dec. 12, 1907, $350. What was the amount due at maturity?

19. On a note of $4000, dated March 12, 1907, are endorsed the following payments: Aug. 18, 1907, $325; April 9, 1908, $75; July 3, 1908, $400; Dec. 4, 1908, $150. How much was due Feb. 25, 1909?

20. A note of $3600, at 5%, dated Feb. 5, 1905, bore the following endorsements: July 15, 1905, $300; Oct. 7, 1905, $125; Jan. 8, 1906, $25; Aug. 3, 1906, $130; Dec. 19, 1906, $175; May 3, 1907, $200; Aug. 16, 1907, $400;

Jan. 1, 1908, $150. What was the balance due April 12, 1908?

21. What was the balance due Aug. 3, 1908, on a note of $7600, at 7%, dated Dec. 15, 1905, and upon which the following payments had been made: Jan. 24, 1906, $576; March 15, 1906, $237; May 2, 1906, $25; Jan. 10, 1907, $40; Sept. 23, 1907, $675, and Feb. 28, 1908, $750.

22. On a note for $576.76, due in two years, the following endorsements were made: Jan. 10, 1908, $75; July 25, 1908, $63; Dec. 18, 1908, $18.75; and Aug. 12, 1909, $5.75. What will be due at maturity if the note is dated Dec. 25, 1907?

23. $1000.00 BOSTON, MASS, May 12, 1907.

Three years after date I promise to pay to the order of Bay State Trust Co. one thousand and $\frac{00}{100}$ dollars, value received, with interest. C. D. SMITH.

Endorsements: Recd. June 1, 1907, $200; recd. Oct. 8, 1907, $15; recd. Feb. 7, 1908, $150; recd. July 10, 1909, $300. What will be due at maturity?

24. A mortgage of $6000, dated Sept. 3, 1905, bore the following endorsements: Interest at 6%. Dec. 1, 1905, $250; May 1, 1906, $175; Jan. 2, 1907, $200; Feb. 1, 1908, $900; Dec. 1, 1908, $200; June 1, 1909, $250. What sum would pay off the claim Dec. 20, 1909?

BANK DISCOUNT.

57. BANK DISCOUNT is the sum charged by a bank for advancing the present value of a note, draft, or other obligation, at any time before the obligation is due.

58. Bank discount is simple interest, and the principal on which it is computed is the value of the note at maturity.

Thus a note for $1000 is payable in 4 mos., without interest. It is presented at the bank 18 days before it is due. The value of the note at maturity is $1000. The interest or discount on that sum for 18 days at 6% is $3, and the present worth paid to the holder of the note is $997.

But if the above note has been payable with interest at 6%, the value of the note at maturity would be $1000 plus $20 (the interest for 4 mos.). If discounted as before, the discount for 18 days would be on $1020, and the present worth $1020 minus $3.06, or $1016.94.

59. A note maturing on Sunday or a legal holiday is due on the next business day following, and interest is charged to the payment date. Discount is made in the same way, *i.e.*, to the date for payment.

60. TIME DRAFTS are discounted in the same manner as promissory notes.

61. Drafts never bear interest; therefore the value of the draft at maturity is its face.

62. The TERM OF DISCOUNT is the time from the date of discount to the date of maturity.

63. Demand notes cannot be discounted since there is no date fixed upon for their maturity.

64. To find the maturity of a draft drawn payable at a specified time after sight.

RULE. — *Count forward* **from the date of acceptance** *the number of months or days for which it is drawn.*

65. To find the maturity of a note or draft payable at a specified time after date.

RULE. — *Count forward* **from the date of the note or draft** *the number of months or days for which it is drawn.*

66. To find the term of discount.

RULE. — For a fractional part of a year count the exact days from the date of discount to the date of maturity.

EXAMPLES.

Find the maturity of notes dated and payable as follows:

1. Date, Oct. 28, 1907, payable in 3 mos.
2. Date, Oct. 28, 1907, payable in 90 days.
3. Date, Oct. 28, 1907, payable in 4 mos.
4. Date, Oct. 29, 1907, payable in 4 mos.
5. Date, Oct. 31, 1907, payable in 4 mos.
6. Date, Jan. 31, 1908, payable in 1 mo.
7. Date, Feb. 1, 1908, payable in 1 mo.
8. Date, Feb. 28, 1908, payable in 1 mo.
9. Date, Feb. 28, 1908, payable in 30 days.
10. Date, March 19, 1907, payable in 60 days.
11. Date, Sept. 3, 1907, payable in 3 mos.
12. Date, Oct. 10, 1907, payable in 60 days.
13. Date, Nov. 26, 1907, payable in 90 days.
14. Date, Dec. 20, 1907, payable in 2 mos.
15. Date, Jan. 21, 1908, payable in 1 mo.
16. Date, Feb. 16, 1908, payable in 30 days.
17. Date, March 20, 1908, payable in 60 days.
18. Date, April 26, 1908, payable in 2 mos.
19. Date, May 24, 1908, payable in 1 mo.

Find the term of discount in the following cases:

1. Date, July 31, 1908, term of note 2 mos., discounted Aug. 10.

2. Date, June 30, 1908, term of note 60 days, discounted July 15.

3. Date, Aug. 20, 1908, term of note 90 days, discounted Aug. 31.

4. Date, May 25, 1908, term of note 4 mos., discounted on its date.

5. Date, April 30, 1908, term of note 6 mos., discounted June 10.

6. Date, June 11, 1908, term of note 1 yr., discounted Sept. 23.

7. A note is dated July 2, 1907, and made payable Dec. 1, 1907. It was discounted Sept. 5, 1907. What was the term of discount?

8. A note dated March 1, 1907, and payable Jan. 1, 1908, was discounted Sept. 30, 1907. For how long was it discounted?

9. A note due or payable Aug. 24, 1907, was discounted for 57 days. What was the day of discount?

10. A note maturing Nov. 19, 1907, was discounted Sept. 7, 1907. If it was payable 4 mos. after date, what was the date of the note and its term of discount?

67. To find the proceeds of a note when discounted at a bank.

RULE. — *Find the value of the note at maturity. Find the interest on this value for the term of discount, and this interest is the bank discount. Subtract the bank discount from the value at maturity, and the remainder will be the proceeds.*

NOTE. — The value of a note at maturity is its face, if it does not bear interest. If the note be given with interest its value at maturity is the face plus the interest for the time during which the note runs.

The pupil is required to make a statement for each example in Bank Discount like the following:

Ex. Face, $4000. Int. 6%.
Date, Dec. 1, 1906.
Time, 6 mos.
Discounted Jan. 31, 1907, at 5%.

Face . . .	$4000.
Date . . .	Dec. 1, 1906.
Date of Accept. .	———
Time . . .	6 mos.
Rate of Interest .	6%.
Interest . .	$120.
Maturity Value .	$4120.
Maturity Date .	June 1, 1907.
Discount Date .	Jan. 31, 1907.
Term of Discount .	121 days.
Rate of Discount .	5%.
Discount . .	$69.24.
Proceeds . .	$4050.76.

$4120 for 121 days.

82.40	for 120 days.
.6867	" 1 "
6)83.0867	at 6%.
13.8478	" 1%.
69.2389	" 5%.

$4120.	Maturity Value.
69.24	Discount.
$4050.76	Proceeds.

Find the proceeds of the following notes and drafts:

1. Face, $5300.
   Date, March 3, 1907.
   Time, 60 days.
   Discounted April 1, 1907, at 5%.

2. Face, $5000. Interest at 6%.
   Date, March 3, 1908.
   Time, 90 days.
   Discounted April 1, 1908, at 4½%.

3. Face, $4534.80. Interest at 7%.
   Time, 6 mos.
   Date, March 1, 1907.
   Discounted April 22, 1907.

4. Face, $4126. Interest at 6%.
   Date, March 1, 1907.
   Time, 90 days.
   Discounted April 22, 1907.

5. Face, $1400.
   Time, 4 mos.
   Date, March 31, 1907.
   Discounted April 29, 1907.

6. Face, $2500.
   Time, 4 mos.
   Date, Oct. 30, 1907.
   Discounted Jan. 3, 1908, at 5%.

7. Face, $3000; draft 90 days' sight.
   Date, Oct. 31, 1908.
   Accepted Nov. 2, 1908.
   Discounted Jan. 12, 1909, at 5%.

8. Face $4500; draft 3 mos. from date.
   Date, Nov. 30, 1907.
   Accepted Dec. 1, 1907.
   Discounted Jan. 2, 1908.

9. Face, $4100; draft 60 days' sight.
Date, Jan. 2, 1908.
Accepted Jan. 5, 1908.
Discounted Feb. 1, 1908.

10. Face, $2300, 3 mos., with interest at 6%.
Date, Jan. 3, 1908.
Discounted Feb. 15, 1908, at 5½%.

11. Face, $4125.80. Interest at 5%.
Time, 90 days.
Date, Jan. 4, 1908.
Discounted Feb. 15, 1908, at 4%.

12. Face, $3250; draft 4 mos. from date.
Date, Oct. 30, 1907.
Accepted Nov. 3, 1907.
Discounted Jan. 4, 1908.

13. Face, $4000.
Time, 60 days.
Date, Jan. 4, 1908.
Discounted Feb. 1, 1908, at 5%.

14. Face, $3150.
Time, 90 days.
Date, Jan. 1, 1908.
Discounted Feb. 1, at 4½%.

15. Face, $4200.
Time, 3 mos.
Date, Jan. 1, ~~1908~~.
Discounted Feb. 1, ~~1908~~, at 5½%.

16. Face, $5200, 60 days' sight.
Date, Feb. 1, 1908.
Accepted Feb. 3, 1908.
Discounted March 3, 1908, at 5%.

17. Face, $4800, 3 mos. from date.
Date, Feb. 2, 1908.
Accepted Feb. 5, 1908.
Discounted Feb. 28, 1908, at 4%.

18. Face, \$5000. Interest at 6%.
Time, 60 days.
Date, Jan. 1, 1908.
Discounted Feb. 6, 1908, 5%.

19. Face, \$6175. Interest at $5\frac{1}{2}$%.
Time, 4 mos.
Date, Jan. 8, 1908.
Discounted Feb. 29, 1908.

20. Face, \$4700.
Time, 60 days.
Date, March 17, 1900.
Discounted April 10, 1900, at 5%.

21. Find the proceeds of a 30-day note for \$10000, dated Nov. 10 and discounted Nov. 15 at 6%.

22. A note for \$7500, payable in 1 mo., was dated and discounted March 25. What were the proceeds?

23. With what sum would a person be credited at his bank if he deposit, July 18, a draft for \$9000, accepted June 23, and dated June 20, the draft being payable at 90 days' sight?

24. Find the bank discount of a note for \$1800, dated July 23, 1907, payable in 90 days and discounted Aug. 6, 1907, at 5%.

25. A note for \$4000, dated April 17, payable 4 mos. from date, was discounted May 31. What were the proceeds?

26. I can sell a horse for \$350 cash, or for \$375 on a six-months' note. Which offer should I accept if money is worth $\frac{1}{2}$% per month?

27. H. M. Faxon's draft for \$5000, dated July 23, 1907, payable 3 mos. after date, was discounted Aug. 19 at 5%. What were the proceeds?

28. I hold a note for \$15000, dated Oct. 9, 1907, $\frac{1}{4}$ of the sum due in 5 mos., $\frac{1}{8}$ in 9 mos., and the remainder in 1 year. What is the value of the note on its date?

29. A firm sold goods that cost $1450 for $1693.50 on a note at 90 days, and had the note discounted on the day of sale at 7%. How much did the firm gain on the goods sold?

30. F. E. Proctor's draft on A. F. Dwight for $1200, favor H. W. Washburn, dated July 10, 1908, payable 90 days after date, was accepted July 13 and discounted July 31 at 7%. Find the proceeds.

31. My draft for $2000 on A. E. Kingsbury, favor A. H. Adams, payable at 60 days' sight, was discounted at 5% May 10, 1907. The draft was drawn April 29 and accepted May 2. What were the proceeds?

32. Thomas Long Co. drew on R. H. White Co. June, 27, 1907, for $6600, payable at 90 days' sight, and remitted the draft to me to be credited on account. I presented it for acceptance July 1, and deposited it at my bank July 5. What sum was passed to my credit?

33. Sold goods that cost $3145 at 10% profit, on a note at 30 days, and discounted the note the same day at the Massachusetts National Bank, at 5½%. What was my net profit on the goods?

34. Goods that cost $2800 I sell at 15% advance, and take a 60-day note in settlement. If I discount this note on its date at 5%, what is my clear gain?

35. A note for $3000, dated May 29, 1907, payable in 6 mos. with 5% interest, has the following endorsements: July 3, $400; July 31, $350; Sept. 5, $850. The note was discounted Sept. 25 at 6%. Find the proceeds.

36. Feb. 1 I sold goods for $2460, on a note at 1 month without interest. I had the note discounted Feb. 10 at 6%. Did I get more or less for my goods than I should have had if the note had been drawn at 30 days? How much?

37. How much greater is the bank discount of a note for $3400, payable in 3 mos. with 5% interest, dated and discounted Aug. 6, than that of one for the same sum

dated and discounted Aug. 6, and payable in 3 mos. without interest?

38. A note for $8000, dated May 2, 1907, payable in 6 mos. with 7% interest, was sent to the bank for deposit May 29. How much more will be passed to the holder's credit if the discount be found for the calendar months than if it were to be found for the exact days?

39. I borrowed $2000 March 10; $1500 March 31; $1200 April 17; and $1800 April 25. April 30 I drew a note for $7000, one-half payable in 60 days and the remainder in 3 mos. The note was discounted on its date at 6%. How much of the proceeds did I have remaining after paying the several loans and interest?

40. Jan. 5, 1907, bought of Chas. H. Brooks, terms net cash, 56 bbls. sugar averaging 319 lbs. to the barrel, 5½ cts. per pound. Gave him $400 cash. For what amount must I draw my 60-day note so that if discounted on its date the proceeds cancel the bill?

41. The notes of a manufacturing company were selling "on the street" at a 10% discount. Knowing their paper to be safe for an investment, I purchased the following notes June 30, and immediately deposited them at my bank:

One for $6000, dated June 18, payable in 3 mos.
One for $12000, dated June 18, payable in 90 days.
One for $5000, dated May 10, payable Sept. 14.
One for $8500, dated May 18, payable in 60 days with 6% interest.

The notes were all paid in full by the company. How much did I gain?

42. On June 3, 1907, I deposited at my bank the following:

A note for $1200 dated April 22, 1907, bearing 2 yrs. interest at 4½%, and a 60-day sight draft for $900, accepted May 15, 1907. Both were discounted at 6%.

What sum was passed to my credit?

43. Sept. 12, 1907, I held a note for $6750, maturing in 60 days. Desiring the present worth of this note for immediate use, I had it discounted at my bank at $4\frac{3}{4}\%$. I could have sent the note to a broker who would discount it at $4\frac{1}{2}\%$, and charge $\frac{1}{4}\%$ for his fee. Did I gain or lose by sending to the bank? How much?

44. Sept. 15, 1907, I deposited the following paper at my bank:

A note for $450, dated July 10, payable in 4 mos.
A check for $2000, dated Sept. 13.
A note for $5000, dated Aug. 11, payable Sept. 21.
A draft for $1850, accepted Sept. 14, at 10 days' sight.
A note for $875, dated Sept. 1, payable in 90 days.
A 30 days note for $350, dated Aug. 25, and payable with 6% interest.

How much was passed to my credit?

68. To find the sum for which a note must be drawn so that, if discounted on its date, the proceeds will be a given sum.

Up to this point in our work all notes for loans have been considered as drawn according to the custom among individuals, — viz., by making the sum loaned the face of the note. Except for special reasons banks will not loan in this manner, their custom being to deduct interest in advance for the full term of the note. Thus it will be seen that the actual loan is smaller than the face of the paper. By the following rule we determine the face of a note to secure a given loan at the bank.

RULE. — *Find the interest on the desired proceeds for the time the note is to run at the given rate of discount. Find the interest on this interest for the same time and rate. Find the interest on this interest as before. Add the proceeds and the several interests. The sum will be the face of the note.*

NOTE. — The old rule, to "divide the required proceeds by the proceeds of $1.00 for the given time and rate," is regarded as rather tedious, but perhaps more accurate. Unless the sum be very large, or the time longer than that for which notes are usually written, the rule given above will give the correct result. In case of a large sum or long time, or both, it is only necessary to continue finding interest on interest to make the necessary correction.

EXAMPLES.

1. For what sum must a 60-day note be drawn so that if discounted on its date the proceeds will be $3000?

2. I wish to obtain at the bank a loan of $5200 for 90 days. What should be the face of the note to cover discount and proceeds?

3. I owe $10000, and in payment give a note for $6000 that will mature in 25 days, discounted at 5½%. How large a note must I draw payable in 2 mos. so that when discounted on its date the proceeds will pay the balance of my debt?

4. A debt of $7500 is to be cancelled by two notes. One is a note for $6000, maturing in 1 month. The other is to be drawn at 30 days for such a sum that when discounted on its date the proceeds of both notes will pay the debt. What shall be the face of the second note, the rate of discount in both cases being 5%?

5. For what sums must notes be drawn for discount on their dates at 7% for the given times to cover the given sums and discount?

A proceeds of $1500 for 90 days.
A proceeds of $2400 for 4 mos.
A proceeds of $1875 for 60 days.
A proceeds of $20000 for 15 days.

6. I purchased goods amounting to $875 on 6 months' credit, 5% discount being offered for cash. I immediately accept the cash offer, and have my note for 60 days discounted at the bank at 6% for just enough to settle the account. What was the face of the note?

AVERAGING OF ACCOUNTS.[1]

69. AVERAGING OF ACCOUNTS is the process of finding when the sum of the items in an account having only a Dr. or a Cr. side, or when the balance of an account having both Dr. and Cr. sides, may be paid without loss to either party interested.

70. When one side of the account is considered, the process is called SIMPLE AVERAGE. If both sides are used, COMPOUND AVERAGE.

PRINCIPLE OF AVERAGING ACCOUNTS.

71. If money be paid before it is due, the Dr., or the payer, loses the interest on his money, and the Cr. gains; if paid after it is due, the Dr. gains the interest on his money and the Cr. loses. The date found must then be the one on which the gains of either party equal his losses, — at least within one half-day's interest on the sum or balance due.

72. By assuming some date for settlement, and finding the gain or loss by settling on that date, we find by Problem 2 of Simple Interest how long before or after the assumed *date the sum or balance should be paid in order to cancel the gain or loss.*

73. The *assumed date* is called the FOCAL DATE.

The FOCAL DATE may be any date; but, for the sake of uniformity in practice and ease of use, we take the "zero date" of the earliest month in

[1] This subject is very important in business, since the book-keeper is enabled, by finding the average date, to enter the amount or balance of the whole account in one sum as due at one date, and, further, to compute interest on such sum, when not paid at the average date, from that date to any date of settlement.

which any item is due. Thus, if the several items are due April 30, May 28, July 2, and Aug. 13, the Focal Date would be March 31, or, as it will be called, April 0.

74. The amount required to settle an account at any other time than the average date is called the CASH BALANCE. It is the present worth of the debt or balance.

NOTE. — For any time less than three months exact days are counted.

SIMPLE AVERAGE OF ACCOUNTS.

75. SIMPLE AVERAGE OF ACCOUNTS is the process of finding when the several items of an account having but one side may all be paid without loss to either Dr. or Cr.

76. To find the Average Due Date of an account containing only Dr. or Cr. items.

RULE. — *Find the due dates of the several items. Select as the focal date the zero date of the earliest month any item is found to be due.*

Find the interest on each item from the focal date to its due date, counting the exact time in days. Divide the sum of the interests thus found by the interest on the sum of the items for one day, and the quotient thus found will be days.

Count forward the days thus found from the focal date, and the result is the Average Due Date.

NOTE 1. — When terms of credit are given on any or all of the several items the due date is found by counting the term given, forward from the date of sale. When a note, draft, or acceptance is given its maturity is found by counting forward from the date at which the paper was written the exact time for which it was drawn.

NOTE 2. — The "interest on the sum of the items for one day," as mentioned in the rule, will frequently contain an awkward fraction. To avoid this, divide 6 times "the sum of the interests" by the interest on the sum of the items for 6 days.

NOTE 3. — If the *same* term of credit be given on *all* the items average the account without finding the due dates, and the result will be the average date of purchase or sale. To this result add the uniform term of credit, and the result will be the average due date.

NOTE 4. — If a note is to be given to secure the payment of an account having the *same* term of credit on *all* its items the date of the note should be the average date of purchase (see Note 3), and the term for which it is drawn should be the uniform term of credit — the note being payable *without* interest. In general, a note given to secure the payment of *any* account, or the balance thereof, may be dated at convenience and made payable with interest after the Average Date.

NOTE 5. — The pupil is directed to find the *due* dates of the several items before beginning solutions, that, when the question is solved, the same dates as used in the solution may stand ready for the proof, without the trouble and perplexity of alterations. In such an account as named in Note 3, the due dates are unnecessary either for solution or proof.

PROOF.

RULE. — *Rewrite the account, arranging the items in the order in which they are due. Draw a line separating those items that are due before the Average Date from those that are due after the Average Date. Get the interest on the items above the line from their respective due dates to the Average Date; on the items below the line from the Average Date to their respective due dates. If the items form the Dr. side of an account the interest on those above the line will be* GAIN, *and the interest on those below the line will be* LOSS. *If the items form the Cr. side of an account the interest on those above the line will be* LOSS, *and the interest on those below will be* GAIN. *In either case the total gain should equal total loss. The difference, if any, between the gains and losses should be less than one half-day's interest on the sum of all the items; otherwise the work is wrong.*

STATEMENT OF ACCOUNT.

BOSTON, MASS., Sept. 3, 1907.

GEORGE B. KINGSBURY, To H. E. WELLS, *Dr.*

Jan.	12	To Mdse.,	30 d.	$600	00
Feb.	17	" "	60 d.	440	00
Mar.	14	" "	90 d.	260	00
April	11	" "	30 d.	280	00
May	5	" "	10 d.	220	00

Find the Average Due Date of Settlement.

SOLUTION.

Feb. 0 = Focal Date.

Feb. 11,	$600	11 d.	$1.10
April 18,	440	77 d.	5.6467
June 12,	260	132 d.	5.7200
May 11,	280	100 d.	4.6667
" 15,	220	104 d.	3.8133
	$1800		20.9467

6)1.800
.30

)20.9467(69+1 = 70 days.
180
294
270
.2467

Feb. 0 + 70 days = April 11, Av. due date.

PROOF.

April 11	Feb. 11,	$600	59 d.	$5.90
	April 18,	440	7 d.	.5133
	May 11,	280	30 d.	1.40
	" 15,	220	34 d.	1.2467
	June 12,	260	62 d.	2.6867
				5.8467

5.90
5.8467
.0533 = Proof.*

EXAMPLES.

1908.

1. June 12, $700.
July 18, 425.
Sept. 26, 375.
Oct. 30, 610.

1909.

2. Jan. 1, $435.
Feb. 28, 600.
March 3, 840.
March 31, 925.
April 11, 65.

* Less than one-half day's interest.

	1907.		1908.
3.	Sept. 4, $625.	*4.*	March 3, $200.
	Oct. 23, 300.		April 6, 400.
	Nov. 7, 825.		June 8, 750.
	Dec. 4, 200.		Aug. 18, 800.
			Sept. 24, 165.

	1907.		1907.
5.	Nov. 14, $400, 30 days.	*6.*	Dec. 15, $300, 2 mos.
	Nov. 30, 600, 3 mos.		1908.
	Dec. 14, 300, 30 days.		Jan. 16, $500, 60 days.
	1908.		Feb. 14, 375, 30 days.
	Jan. 31, $200, 60 days.		Mar. 27, 650, cash.

77. To find the average term of credit.

RULE.— *Find the due dates of the several items. Count the exact days from the date of sale to these due dates, then multiply each item by the number of days thus found. Add the items and divide the total of the products by the sum of the items. Regard sight drafts and the proceeds of discounted notes as cash items.*

ILLUSTRATIVE EXAMPLE.

1900.		
Jan. 15	$200	2 mos.
"	300	60 days.
"	400	30 days.
"	250	10 days.

1900			
Jan. 15	$200	59	11800
"	300	60	18000
"	400	30	12000
"	250	10	2500
	1150		1150)44300(38 + 1 = 39
			3450
			9800
			9200
			600

Average term of credit = 39 days.

EXAMPLES.

1899.		1900.	
1. Dec. 20,	$300, 30 days.	*2.* March 6,	$410, 20 days.
"	450, 60 days.	"	360, 30 days' note.
"	700, 3 mos.	"	240, cash.
		"	150, 4 mos.

3. Dec. 19 sold J. F. Clark 75 bbls. flour at $5.38, receiving in payment a note at 60 days for $220.75, due Jan. 24, less discount for the unexpired time; balance on account at 15 days. Find term of credit.

4. On Nov. 15 sold S. S. Pierce & Co. 100 bbls. flour at $5.37½. Received in payment a note dated Nov. 5, at 33 days, endorsed to our order, face $200; balance on 30 days' credit. Find the term of credit.

5. Dec. 27 sold A. S. Morrison & Bros. 100 bbls. flour at $4.75, 60 bbls. flour at $4.37. Received in payment their note at 60 days, dated Dec. 26, for $285.25; balance on account at 30 days. Find term of credit.

6. Nov. 9 sold A. T. Kirby 100 bbls. St. Louis flour at $4.38, receiving in payment W. E. Dow's note at 60 days for $167.38, due Dec. 15, less discount for the unexpired time; H. W. Parker's note at 60 days for $219, dated Nov. 1; balance on account at 30 days. Find average term of credit.

RULE.— *To find the Cash Balance. The balance of the account is the amount due on the average due date. If settlement is made before this average due date, interest at the given per cent is figured on the balance of the account from the date of settlement to the average date and subtracted from the balance of the account. If settlement is made after the average due date, figure interest on the balance of account from the average due date to date of settlement and add it to the balance of account. All time under three (3) mos. is taken in exact days, over 3 mos. in mos. and days.*

COMPOUND AVERAGE OF ACCOUNTS.

78. COMPOUND AVERAGE OF ACCOUNTS is the process of finding when the balance of an account containing both Dr. and Cr. items may be paid without loss to either party interested.

79. To find the Average Due Date of an account containing both Dr. and Cr. items.

RULE. — *Find the due dates of the items on both sides. Select as the focal date the zero date of the earliest month in which any item on either side is found to be due.*

Find the interest on each item on both sides of the account from the focal date to its due date, counting the exact time in days. Subtract the sum of the interests on one side from the sum of the interests on the other. Divide the difference in interests by the interest of the balance of the account for one day, and the quotient will be the time in days.

If the difference in interests and the balance of the account are both on the same side of the account count this time forward from the focal date; if they are on opposite sides of the account count the time backward from the focal date. The result will be the Average Due Date of the account.

PROOF.

RULE. — *Rewrite each side of the account as in the proof of Simple Average.*

Draw a line in each side, separating the items that fall due before the Average Date from those that fall due after the Average Date.

Find the interest on the several items on each side as directed in the proof of Simple Average, and mark these interests "Gains" or "Losses," as the case may require. After the "Gains" and "Losses" have been found on both sides the sum of the "Gains" on the two sides should equal the sum of the "Losses." The difference, if any, should be less than one half-day's interest on the balance of the account; otherwise the work is wrong.

EXAMPLE.

Dr. *Cr.*

1908.				1908.			
June 6	$2200	00	2 mos.	Sept. 5	Cash .	$2892	00
Aug. 12	1400	00	12 d.	Aug. 12	" . .	108	00

Find the Cash Balance for April 12, 1908, at 6%.

ILLUSTRATION.

1908.				1908.			
Aug. 6.	$2200	6	2.20	Sept. 5	$2892	36	17.352
" 24.	1400	24	5.60	Aug. 12	108	12	.216
	$3600		7.80		$3000		17.568
	3000						7 80
	6) .600						9.768
	.10						

97 + 1 = 98 days back of Aug. 0 = April 24, 1908, Av. Due Date.

.100) 9.768
9.0
.76
.70
.068

$600.00 = bal. of acct.
1.20 = 12 days' int.
598.80 = Cash balance.

PROOF.

Aug. 6	$2200	104	38.1333	
" 24	1400	122	28.4667	
			66.600	
			66.568	
			.032 Proof.*	
Aug. 12	$108	110	1.98	
Sept. 5	2892	134	64.588	
				66.568

* Less than one-half day's interest on balance of the account.

EXAMPLES.

1.

Dr. J. W. BLAISDELL. *Cr.*

1907.				1907.			
May 4	Net . . .	$525	30	June 2	Cash . . .	$200	00
June 6	" . . .	410	00	" 8	" . . .	325	00

Find Cash Balance Feb. 11, 1908, at 5%.

2.

Dr. A. W. MORSE. *Cr.*

1907.				1907.			
May 15	30 da. . . .	$650	00	June 22	Cash . . .	$300	00
June 8	60 " . . .	470	50	Aug. 24	30 da. note .	375	00
July 11	90 " . . .	820	00	Sept. 7	Cash . . .	400	00
Aug. 9	Net . . .	360	75				

Find Cash Balance March 30, 1908, at 7%.

3.

Dr. H. E. HIBBARD. *Cr.*

1907.				1907.			
Dec. 12	Cash . . .	$1300	00	Dec. 25	Cash . . .	$700	00
" 27	10 da. . . .	695	70				
1908.				1908.			
Feb. 3	30 da. . . .	565	50	Jan. 1	90 da. note .	1200	75
Mar. 17	10 " . . .	950	00	April 4	Cash . . .	600	00

Find Cash Balance June 30, 1908, at 7%.

4.

Dr. N. H. ATKINS. *Cr.*

1907.				1907.			
Oct. 5	60 da. . . .	$375	00	Nov. 9	Cash . . .	$300	00
Nov. 10	30 " . . .	460	50	Dec. 3	" . . .	400	00
Dec. 14	60 " . . .	700	00				
Dec. 21	10 " . . .	500	00				

Find Cash Balance Jan. 31, 1908, at 5½%.

5.

Dr. L. O. WHITE. *Cr.*

1907.				1906.			
Jan. 4	30 da. . . .	$725	38	Dec. 30	Cash . . .	$5000	00
" 27	20 " draft .	1500	00	1907.			
Feb. 4	30 " . . .	700	00	Jan. 1	60 da. . . .	485	52
Mar. 17	10 " accept.	2500	00	Mar. 12	2 mos. note .	600	00

Find Cash Balance Jan. 4, 1908, at 7%.

6.

Dr. H. M. DUFFILL. *Cr.*

1907.				1907.			
May 10	30 da. . .	$650	72	June 16	Cash . . .	$523	10
June 24	60 " . . .	225	00	Sept. 20	" . . .	376	25
June 10	60 " . . .	294	23	Oct. 5	" . . .	700	00
Aug. 28	90 " . . .	410	62	" 21	" . . .	627	63

Find Cash Balance Feb. 28, 1908, at 6%.

7.

Dr. L. A. SMITH. *Cr.*

1907.				1907.			
Jan. 1	Balance . .	$723	32	Feb. 21	Cash . . .	$450	00
" 27	30 da. . . .	1275	00	" 28	15 da. draft .	625	00
Mar. 24	Net . . .	510	76	April 30	Cash . . .	975	00
April 2	30 da. . . .	426	93				

Find Cash Balance Aug. 31, 1907, at 5%.

8.

Dr. H. K. GOOD. *Cr.*

1907.				1907.			
April 20	3 mos. . .	$1400	00	July 5	3 mos. note .	$1500	00
May 15	60 da. . . .	2835	75	Sept. 28	Cash . . .	1050	00
June 16	30 " . . .	873	00	1908.			
July 10	10 " . . .	700	00	Jan. 15	Cash . . .	800	00
				" 22	" . . .	1350	00

Find Cash Balance May 4, 1908, at 7%.

AVERAGE OF ACCOUNTS OF SALES.

80. AVERAGING OF ACCOUNTS OF SALES is the process of finding the date on which the net proceeds of a consignment may be paid without loss to consignor or consignee.

81. In the account as rendered by the consignee the sales form the credit side and the charges the debit side.

82. The money received from sales is regarded as due the consignor as soon as received by the consignee.

83. To find Net Proceeds, deduct from the total sales all of the charges, such as freight, storage, insurance, cooperage, commission, etc.

84. To find Cash Balance.

RULE.— *Find the average due date of the sales as in Simple Average. Add the commission to other charges and subtract the total charges from the total sales. This gives the Net Proceeds. Figure interest on charges paid in cash and on cash advanced on the consignment from the dates they were paid to the date of last sale; also on the total sales from date of last sale to the average due date. Subtract cash advanced from the net proceeds. From this balance subtract the sum of the interest statement. This gives balance due on the date of last sale. If balance is required for some later date, add interest at 6% figured on the balance due on date of last sale, from the date of last sale to such date as is given.*

EXAMPLE.

On Oct. 6 I received a consignment of 250 bbls. of flour to be sold for the account of the consignors. On that date paid transportation, $150, in cash. On Oct. 9 I sold 100 bbls. at $4, 30 days' credit. Oct. 12 I received a sight draft for $450 in anticipation of proceeds, which I paid in cash. On Oct. 15 sold 100 bbls. at $3.50, 60 days' credit. Oct. 22 sold 50 bbls. at $4, cash. On Oct. 22 there was a charge for storage of $25 and insurance $40. Commission, 3% on sales. Find the cash balance for the date of the last sale.

SOLUTION OF ABOVE.

SALES.

Oct.	9	100 bbls. flour @ $4.00, 30 days . .	$400	00		
	15	100 " " @ 3.50, 60 " . .	350	00		
	22	50 " " @ 4.00, cash. . . .	200	00	$950	00
		Sales due by average, Nov. 18.				

CHARGES.

Oct.	6	Const. Freight, paid in cash	$150	00		
	22	Insurance	40	00		
	22	Charges for Storage	25	00		
	22	Commission	28	50	$243	50
		Net Proceeds			$706	50
		Advanced Oct. 12			450	00
					$256	50

INTEREST STATEMENT.

Oct.	22	10 days' interest on draft		75		
	22	27 days' interest on sales	$4	28		
	22	16 days' interest on freight and drayage		40	$5	43
		Bal. due Oct. 22			$251	07

EXAMPLES.

1. Average the following Account Sales of 5000 bu. wheat received from W. M. Harper & Co. to be sold on their account and risk. Find the amount of cash required to settle their account on Aug. 21.

SALES.

Aug. 6, 1500 bu. @ $1.25, 30 days.
" 10, 500 " @ 1.30, 1 mo.
" 10, 2000 " @ 1.28, cash.
" 21, 1000 " @ 1.25, 15 days.

CHARGES.

July 28,	Const. Freight, paid in cash	$175.00
" 30,	Paid cash for advertising	20.00
Aug. 21,	Insurance	8.00
" 21,	Charges for Storage	40.00

Commission, 3% on sales.

2.

SALES.

Aug. 8, 300 bbls. flour @ $5.75, 60 days.
" 14, 400 " " @ 5.50, cash.
Sept. 1, 250 " " @ 5.70, 60 days.
" 14, 280 " " @ 5.65, 30 "

CHARGES.

Aug. 14,	Const. Freight, paid in cash	$115.00
Sept. 1,	Insurance	75.00
" 14,	Charges for Storage	40.00

Commission, 5% on sales.

On Sept. 14 I forwarded the consignors a cashier's draft for $3000 advance payment in anticipation of proceeds. Find the cash balance for Nov. 30.

3. Oct. 5, received from Driscoll & Co., Chicago, Ill., 500 bbls. Ex. Prime Mess pork to be sold for their account. Paid freight and drayage, $4.50. Oct. 7, forwarded them cashier's draft on Chicago for $5000 advance payment in anticipation of their proceeds. Sales: Oct. 6, 300 bbls., 30 days, at $16.50; Oct. 11, 100 bbls., 45 days, at $16.75; Oct. 14, 50 bbls., cash, at $16.25; Oct. 20, 50 bbls., cash, at $16.25. Oct. 20, charges for storage, cooperage, etc.,

$25.67; insurance $\frac{1}{4}\%$ on sales; commission and guaranty 5% on sales. Render consignee account sales. Find due date of sales; also amount of cash required to settle account with them on Oct. 20.

4.

SALES.

June 18, $800, 1 mo.
July 24, 800, 30 days.
" 29, 800, cash.

CHARGES.

July 29, Const. Freight, paid in cash $60
" 29, Insurance 12
Commission, 5%.

July 26, sight draft in anticipation of proceeds paid in cash, $1000. Find cash balance for Sept. 28.

5.

SALES.

Nov. 24, $600, 1 mo.
" 30, 800, 60 days.
Dec. 4, 400, cash.

CHARGES.

Nov. 30, Const. Freight, paid in cash $60
Dec. 4, Insurance 10
Commission, 5%.

On Dec. 1, advanced cash on consignment, $1000. Find cash balance for Dec. 30.

6.

SALES.

Oct. 5, 240 bbls. apples @ $2.10, cash.
" 10, 300 " " @ 1.85, 1 mo.
" 16, 200 " " @ 1.50, 1 mo.
" 27, 400 " " @ 1.60, cash.

CHARGES.

Oct. 1, Const. Freight, paid in cash $525
" 27, Charges for Storage 40
Commission, 3% on sales.

On Oct. 26 I paid sight draft in cash, $800, in anticipation of proceeds. Find cash balance for Nov. 1.

7.

SALES.

July 3, 25 bbls. pork @ $12.80, 30 days.
" 23, 45 " " @ 12.60, 15 "
Aug. 6, 40 " " @ 13.00, 1 mo.
" 17, 30 " " @ 12.85, 1 "

CHARGES.

July 1, Const. Freight, paid in cash $71
Aug. 17, Insurance 60
Commission, 5%.

On July 5 I advanced cash on consignment, $250. Find cash balance for Aug. 20.

8.

SALES.

Aug. 16, 2000 bu. wheat @ $1.10, 30 days.
" 21, 1000 " " @ 1.20, 30 "
Sept. 20, 1000 " " @ 1.35, 15 "
" 30, 1000 " " @ 1.40, 1 mo.

CHARGES.

Aug. 16, Const. Freight, paid in cash $200
Sept. 30, Insurance 25
Commission, 5%.

On Sept. 24 I paid cash on consignment in anticipation of proceeds, $3000. Find cash balance for the date of the last sale.

9.

SALES.

Jan. 1, $400, 2 mos.
" 16, 600, 2 "
Feb. 12, 800, 60 days.

CHARGES.

Jan. 7, Const. Freight, paid in cash $40
Feb. 12, Insurance 18
Commission, 5%.

On Jan. 1, sight draft in anticipation of proceeds paid in cash, $400. Find cash balance for March 13.

PERCENTAGE.

85. PERCENTAGE is the term applied to operations in figures in which 100 is used as the basis of computation.

86. The term "per cent." [Latin per centum] means by the hundred, or, more simply, hundredths. It may be expressed in three different ways — by the sign %, by a decimal, and by a fraction.

ILLUSTRATION.

Sign.	Decimal.	Fraction.	Sign.	Decimal.	Fraction.
1%	.01	$\frac{1}{100}$	$\frac{1}{2}$%	.005	$\frac{1}{200}$
25%	.25	$\frac{25}{100}$	$2\frac{1}{2}$%	.025	$\frac{1}{40}$
67%	.67	$\frac{67}{100}$	$33\frac{1}{3}$%	.$33\frac{1}{3}$	$\frac{1}{3}$

As hundredths occupy two decimal places, every *per cent.* requires two or more decimal figures. If a given *per cent.* is less than 10. a cipher must be prefixed to the figure denoting it. Thus 2% is written .02.

87. The elements of percentage are: the BASE, the RATE, and the PERCENTAGE. If any two are given the other can be found.

88. The BASE is the number of which a number of hundredths are taken.

89. The RATE is the number of hundredths taken.

90. The PERCENTAGE is the result obtained by taking a certain number of hundredths of the base.

Statement. — 20% of 250 is 50. 250 is the *Base*, 50 is the *Percentage*, and 20% is the *Rate*.

To read per cent. expressed decimally:

RULE. — *Call the first two decimal figures per cent. and those on the right decimal parts of* 1%.

91. Common fractions may be used to advantage in many operations in percentage and its applications.

$\frac{1}{2}\%$	.005	$\frac{\frac{1}{2}}{100}$	$\frac{1}{200}$	$11\frac{1}{9}\%$	$.11\frac{1}{9}$	$\frac{11\frac{1}{9}}{100}$	$\frac{1}{9}$
1 %	.01	$\frac{1}{100}$	$\frac{1}{100}$	$12\frac{1}{2}\%$	.125	$\frac{12\frac{1}{2}}{100}$	$\frac{1}{8}$
$1\frac{1}{4}\%$	.0125	$\frac{1\frac{1}{4}}{100}$	$\frac{1}{80}$	$14\frac{2}{7}\%$	$.14\frac{2}{7}$	$\frac{14\frac{2}{7}}{100}$	$\frac{1}{7}$
$1\frac{2}{3}\%$	$.01\frac{2}{3}$	$\frac{1\frac{2}{3}}{100}$	$\frac{1}{60}$	$16\frac{2}{3}\%$	$.16\frac{2}{3}$	$\frac{16\frac{2}{3}}{100}$	$\frac{1}{6}$
$2\frac{1}{2}\%$	.025	$\frac{2\frac{1}{2}}{100}$	$\frac{1}{40}$	$18\frac{3}{4}\%$	.1875	$\frac{18\frac{3}{4}}{100}$	$\frac{3}{16}$
$3\frac{1}{3}\%$	$.03\frac{1}{3}$	$\frac{3\frac{1}{3}}{100}$	$\frac{1}{30}$	20 %	.20	$\frac{20}{100}$	$\frac{1}{5}$
$6\frac{1}{4}\%$	.0625	$\frac{6\frac{1}{4}}{100}$	$\frac{1}{16}$	25 %	.25	$\frac{25}{100}$	$\frac{1}{4}$
$6\frac{2}{3}\%$	$.06\frac{2}{3}$	$\frac{6\frac{2}{3}}{100}$	$\frac{1}{15}$	$33\frac{1}{3}\%$	$.33\frac{1}{3}$	$\frac{33\frac{1}{3}}{100}$	$\frac{1}{3}$
$8\frac{1}{3}\%$	$.08\frac{1}{3}$	$\frac{8\frac{1}{3}}{100}$	$\frac{1}{12}$	50 %	.50	$\frac{50}{100}$	$\frac{1}{2}$
$9\frac{1}{11}\%$	$.09\frac{1}{11}$	$\frac{9\frac{1}{11}}{100}$	$\frac{1}{11}$	$66\frac{2}{3}\%$	$.66\frac{2}{3}$	$\frac{66\frac{2}{3}}{100}$	$\frac{2}{3}$
10 %	.10	$\frac{10}{100}$	$\frac{1}{10}$	75 %	.75	$\frac{75}{100}$	$\frac{3}{4}$

What is $12\frac{1}{2}\%$ of 2400?

SOLUTION. — $12\frac{1}{2}\% = \frac{1}{8}$.

$\frac{1}{8}$ of 2400 = 300. *Ans.*

What is $16\frac{2}{3}\%$ of 3600?

SOLUTION. — $16\frac{2}{3}\% = \frac{1}{6}$.

$\frac{1}{6}$ of 3600 = 600. *Ans.*

What is $66\frac{2}{3}\%$ of 1500?

SOLUTION. — $66\frac{2}{3}\% = \frac{2}{3}$.

$\frac{2}{3}$ of 1500 = 1000. *Ans.*

92. Read the following as rates per cent.:

1.	.05	.052	.093	*3.*	.16⅔	.17½	1.07
2.	.125	.065	.076	*4.*	.364	.4575	2.75

NOTE. — Since per cent. can be expressed both by decimal and common fractions, the rules given in decimal and common fractions for changing from one to the other are equally applicable in percentage.

93. To find the percentage, the base and rate being given.

RULE. — *Multiply the* BASE *by the* RATE *expressed decimally.*

NOTE. — If the rate is an aliquot part of 100 it is often quicker and easier to take the parts denoted by the corresponding fraction. Thus for 25% take ¼ of the Base; 33⅓ take ⅓; 50% take ½.

Questions for solution mentally:

1. What is 8% of 500 miles?
2. What is 25% of 240 dollars?
3. What is 30% of 1200?
4. What is 20% of 10 hours 30 minutes?
5. What is 50% of 1050?
6. What is 33⅓% of 252?

PROBLEMS.

1.	What is .06 of 784?	*5.*	What is 1.12% of $365?
2.	4% of 546?	*6.*	36% of $467.54?
3.	19% of 246?	*7.*	12½% of $146.30?
4.	35% of 1200?	*8.*	75% of $465.50?

9. A merchant bought goods for $475.25 and sold them so as to gain 22% on the cost. How much did he gain?

10. A collecting agent collected for his client $2340, charging 5% fee for his services. How much should he receive? How much should he pay to his client?

11. A merchant who failed in business owed me $1465. He was able to pay only 46% of his debts. On that basis, how much should I receive?

12. A merchant bought a bill of goods amounting to $367.40 on 60 days' time, less 5½% if paid within 10 days. On the tenth day he paid the bill. How much did he save by doing so?

13. A. B. had an estate valued at $15000. He gave 10% of it to a church, 12% to a college, and 5% to charitable purposes. How much had he remaining?

14. A man had an annual income of $1200. He paid 20% of it for board, 2% for incidentals, and 5% for clothing. What was the cost of each item of expense, and how much had he left at the close of the year?

15. A manufacturer's price-list of cardboard is $25 per 1000 sheets. He sold a dealer 10000 sheets at a discount of 28% from list price. How much did he receive?

16. A and B invested $2950 each in business. A lost 14½%, and B gained 9%. How much did B then have more than A?

17. Bought 29 bales of cloth, 12 pieces to the bale and 45 yds. to the piece, at $1.12½ per yd. For what must I sell the lot to gain 8⅓%?

18. For what sum must I give my note for 30 days, at 6%, to secure the money to pay for the following insurance: On my store, $7000, at ⅜% premium; stock, $15000, at ½%; on my house, $4000, at ⅝%; furniture, $1800; plate, $450; pictures, $800, and clothing, $250, all at ⅔%; cost of policy, $1.50, and survey of premises, $2?

19. I mixed 45 bu. corn at 90c. with 40 bu. at 95c., and 27 bu. at 85c. At what price per bu. must I sell the mixture to gain 15%?

20. An insolvent firm owes me $4800. If I settle at 65c. on the $1, and discount 3% for prompt payment, what is my loss?

21. What will it cost to insure a store worth $9000 at ¾% on ⅔ of its valuation, and $15000 worth of stock at ½% on ¾ of its valuation?

22. I purchased 19750 lbs. of hay at $16.24 per ton and 9600 lbs. oats at 45c. per. bu. Sold the hay at a gain of 12%, and the oats at 4% loss. What were the proceeds of the sale? How much did I gain or lose?

23. A savings-bank, having failed, declared a dividend of 85% in favor of depositors. A's balance of deposit was $5347.60, B's, $8665.95, and C's, $7680. How much did each lose?

24. The freight of 24685 lbs. of iron was at the rate of $4.50 per ton. The amount of the bill was divided among three railroads, one taking 25%, one 35%, and the other the rest. How much did each get?

25. 12% of a merchant's sales is profit. The sales amount to $28400. What is the cost of the merchandise sold?

94. To find the rate, the base and percentage being given.

RULE. — *Divide the number denoting the* PERCENTAGE *by the* BASE.

NOTE 1. — *Percentage* is found by multiplying the *Base* by the *Rate*. It is therefore the product of two factors. To find the *Rate* we have given — the *Product* and one of the factors which produced it. Dividing the product by one factor must of course give as a result the other factor.

NOTE 2. — Since the Percentage = Base × by the Rate, the Rate = Percentage ÷ by the Base.

EXAMPLE. — 15 is what per cent. of 300.

$$15\ \%\ 300 = .05 \text{ or } \tfrac{15}{300} = \tfrac{1}{20} \text{ or } .05.$$

Examples for solution mentally:

1. What % of $500 is $10?
Model: 10 is $\frac{10}{500}$ or $\frac{1}{50}$ of 500 = 2%.
2. What % of $36 is $9.
3. What % is 1 cwt. of 1 ton?
4. What % is $3.30 of $16.50?
5. What % is 3 pecks of a bushel?
6. What % is 2 dimes of 2 dollars?
7. What % of 28 bushels is 4 bushels?
8. What % of 1 hour is 12 minutes?
9. What % of 5 dimes are 5 mills?
10. What % of $100 is $2.50?

Problems for solution:

1. A merchant purchased goods for $465 and sold them for $560. How many dollars did he gain? What per cent. on the cost did he gain?

2. A collector charged $23.35 for collecting a bill of $467. What rate per cent. did he charge?

3. A bank having a capital of $300000 declared a semi-annual dividend of $1350. What per cent. of the capital was the dividend?

4. A merchant invested a capital of $36498 in business, and found at the expiration of a year that he had made a net gain of $8212.05. What per cent. did he gain?

5. The cost of insuring a cargo worth $6540 was $81.75. What rate did the insurance company charge?

6. A merchant failing in business owes $4560. His assets amount to only $3078. What per cent. of his indebtedness can he pay?

7. A person whose annual income is $1250 pays $275 for board, $125 for clothing, $25 for books, and $37.50 for sundries, and deposits the remainder in a savings bank. What per cent. of his income is each item, and what per cent. does he deposit?

8. Goods that were bought at $4.50 per yard were marked to sell at $6.00. What was the per cent. of gain charged?

9. A farmer owning 100 acres of land sold 50 acres for what the whole lot originally cost him. What per cent. did he gain?

10. Sold 25 tons of coal at $4.75 per ton, and gained $31.25. What is the per cent. of profit?

11. A's money is $1800, and B's is 25% more than A's. 20 0/0 What % less than B's is A's?

12. Two men had each $500; one expended 25% and the other 20%. How much % did one then have more than the other?

13. A contractor builds a railroad at $30000 per mile, and when it is completed he finds it has cost him $92.50 per rod. What % does he gain? What is his total gain on a section of 5 miles?

14. An insolvent debtor owes $33500, and has property worth $23500. What % of his debts can he pay, and what will a man receive who has a claim of $1450?

15. Bought furniture at auction for $75 less than manufacturer's cost, and sold it for $960. What % did I gain if the manufacturer's cost was $975?

16. A merchant's capital is $12000. At the close of the last year his purchases amounted to $28375, and sales $34750. The expenses were $2375. What was his % of gain?

17. I bought a horse for $250 and sold him for $262.50. I afterwards bought him back for $240 and sold him for $255. What was my gain and gain %?

18. A merchant who has a capital of $15000 gains $3875 the first year and loses $2525 the second year. What is his % of gain for the two yrs.?

19. The freight on 4750 lbs. of Mdse. is at the rate of 85c. per 100 lbs. The distance is 320 miles, and the freight is divided between two railroads in proportion to the mileage of each. The distance of the first was 180 miles and of the second 140 miles. What % of the freight-bill will each receive? How much?

20. A merchant lost $3000 of his capital, and had $24000 remaining. What % of his capital did he lose?

95. To find the base, the rate and percentage being given.

RULE. — *Divide the* PERCENTAGE *by the* RATE.

The percentage which is given being the product of the base multiplied by the rate per cent., it follows — that the percentage [product] being divided by the rate [multiplier] must produce the base [multiplicand].

Questions for solution mentally:

1. 9 is 3% of what number?
2. 4 is 25% of what number?
3. 60 is $33\frac{1}{3}$% of what number?
4. 125 is 5% of what number?
5. 20 dollars are $12\frac{1}{2}$% of how many dollars?
6. 360 lbs. are 10% of how many lbs.?
7. 250 miles are $33\frac{1}{3}$% of how many miles?
8. 45 tons are 20% of how many tons?
9. 60 gallons are 40% of how many gallons?
10. 10 grains are 50% of how many scruples?

PROBLEMS.

1. A merchant sold 15% of his stock of goods for $36250. What was his entire stock before the sale?

2. A farmer bought 75 acres of land, which was 33⅓% of what he previously owned. How many acres has he now?

3. Four men, A, B, C, and D, engage in business. A invests 25% of the capital; B, 20%; C, 35%; and D the remainder, amounting to $2500. What is the entire capital, and what is each man's investment?

4. A dealer sold 31% of his stock and had $6475.50 remaining. What was the value of the goods sold?

5. If 16 per cent. of a contract can be performed in 60 days, how long will it take to perform the whole amount of work?

6. A grain dealer bought 465 bushels of oats and found he had 15% more than before. How many bushels had he after the purchase?

7. A has $1200. 15% of A's money equals 10% of B's. How much has B?

8. A owned 40% of the stock of a corporation and sold 25% of his share for $8750. At the same price what would B's share be worth, he owning 33⅓% of the entire stock?

9. A merchant purchased 360 bbls. of flour. The purchase was 75% of his stock after the purchase. What was his original stock?

10. Sold a watch for $85, which was 20% less than cost. What was the loss?

11. A merchant's sales net 12% profit, and losses by bad debts amount to $1300. His net profit is $2800. What is the amount of his sales?

12. Bought a note at 60c. on the dollar, and collected 8% more than I paid. My gain was $24.48. What amount did I collect? What was the face of the note?

13. I loaned a sum of money for two yrs. at 6%, and received at the end of the time $4413.36 as the amount due me. What sum was loaned?

14. A gentleman having a capital of $82125 invested 20% of it in railroad stock at $109.50 per share. How many shares did he buy? The par value of the stock was $100 per share. What was the par value of the capital stock of the railroad, if the stock purchased was 2% of the entire capital?

PRACTICE.

96. *1.* A merchant offered a bill of goods at 12% less than list price, and gave a 3% discount on the remainder for cash. What was the merchant's list price if the cash paid was $3841.20?

2. The tax rate of a city is $10.50 on the $1000. The valuation is: real estate, $12978456.40, and personal property, $5816743.57, and 14½% of the real estate is exempt from taxation. A discount equal to 4% of the whole tax is given for prompt payment. What is the amount of tax collected?

3. A railroad has a capital stock of $33000000. Its business at the end of the last year showed the following results: *Received* — From passengers, $4872656.88; freight, $8846943.40; mails, express, and other sources, $564379.65. *Expended* — For repairs of road and for taxes, $2425574.37; repairs of rolling-stock, tools, fuel, watchmen, etc., $2148632.20; salaries of officials, agencies, and for contingent expenses, $5009194.85. The debt of the road was $7500000, on which it paid interest at 6% for the year. The rent of branch roads was $1115689.10. An accident during the year cost $159875.70. The Government tax on passenger earnings and dividends was $201458.35. The road proposes to reserve at least $450000 before declaring a dividend. Omitting fractions of 1%, what % dividend can the road declare on its capital stock, and what is the total surplus reserved?

4. A gentleman owns three farms worth, respectively, $3800, $3000, and $4200. The first increases in value 15% and the second 12½%. The third decreases 14⅔%. What is the % of increase in the value of all?

5. A is a half owner in a vessel, and sells 20% of his share for $850. What is the value of B's shares, if he owns 37½% of the vessel?

6. A's stock of goods is worth $8534, or 15% more than B's, and 15% less than C's. These three men propose to purchase a store for $10500, and unite in business, each investing, besides his share of the cost of the store, his stock and $300 cash. What will be the total worth of the firm?

7. At his death A's property was valued at $42360,

$27360 being in real estate and the remainder in personal property. His heirs were the widow, three sons, and two daughters. The will provided that the widow should receive ⅓ of the real estate and 20% of the personal property; and that the remainder should be divided among the sons and daughters, each daughter receiving 25% less than a son. What was the share of each?

8. A house completely finished has cost the owner $12894; it is 4 stories high, and on the ground floor are two stores, one of which rents at $225 and the other at $200 per year. Each of the other floors rents at $12.50 per month. The annual expense of the building is $36.89. What is the % of net income?

9. A grocer has two chests of tea, each weighing 60 lbs., one costing $45 and the other $84. He makes the price so as to gain 25%, and sells 8 lbs. from the first chest and 5 lbs. from the second. What did he receive?

10. Bought 60 bbls. of flour at $9 per bbl., but a part of it having been damaged, half of it was sold at a loss of 10%. The remainder was sold at $9.50 per bbl. What was lost by the transaction?

11. Let each of the following columns be considered a separate question and find how the term marked ? may be found if the terms √ are given.

	1	2	3	4	5	6	7	8	9	10	11	12
Base	√	?	√	√	√	?	?	..	..	?	?	..
Rate of percentage	√	√	?	√	√	..	..	?	?	√	√	√
Percentage	?	√	√	..	..	√	√	√	√	..	..	?
Amount	..	..	..	?	..	√	..	√	..	√	..	√
Difference	..	..	..	..	?	..	√	..	√	..	√	..

TRADE DISCOUNTS.

97. In many branches of business the manufacturers and dealers catalogue, or list, their goods at a certain price, called the LIST PRICE. When sales are made the bills sold show this price and the allowance, or TRADE DISCOUNT, that is given the purchaser.

NOTE 1. — To avoid the trouble of re-listing their goods each time the market price changes, this list price is made large enough to cover all ordinary market changes by simply changing the rate of discount on bills sold.

NOTE 2. — Discounts are also given in proportion to the amount of the bill. Thus, a bill of goods listed at $100 is sold subject to a 5% discount, while a bill amounting to $1000 may be subject to a 10% discount.

NOTE 3. — Many establishments sell their goods on a certain term of credit with the privilege of a certain discount if paid before the term expires and another discount for cash. Sometimes, when goods are sold on credit and no other discount is allowed, the seller is willing to discount at a certain rate per annum for the unexpired term, when the bill is paid before it is due. This is similar to Bank Discount. Sometimes, also, this discount is given in addition to the ordinary Trade Discount.

98. The principles used in finding Trade Discounts are like the principles of percentage. The list price is always the base, the discount is the percentage, and the net amount is the difference.

99. To find the net selling price.

RULE. — *Find the discount by Art. 93, and subtract it from the list price.*

EXAMPLES.

Find the selling price of a bill of —

1. $450 sold at a discount of 10%.
2. $1175 sold at a discount of 10% and 5%.
3. $375 sold at a discount of 20% and 10%.
4. $3400 sold at a discount of 10%, 10%, and 2½%.
5. $1960.50 sold at a discount of 25%, 20%, and 10%.

6. What is the net cost of a case of prints containing 3244¾ yds. at 6c. per yd., less 5% and 2%, — cooperage, 50c.?

7. What is the net value of 5 bales cotton cloth, each containing 450 yds., at 7¾c., less 10% and 1%, — charges, $1.50?

8. I can buy goods of one man for $1250, with a discount of 30% and 10%. At another place I can get the same goods at the same price with 40% off. At which place should I buy and how much will I save?

9. July 27 I purchased goods amounting to $1360 on the following terms: 60 days, or less 5% if paid in 30 days, or less 12% if paid in 10 days. How much will settle the bill August 9? How much August 26?

10. A bill of hardware is sold as follows: $45 at a discount of 20% and 10%; $11.50 at a discount of 9%; $18.20 at a discount of 20%, 10%, and 5%; $36.75 at a discount of 10%, 5%, and 2%; $63.75 at a discount of 40%, 10%, and 2%; $192 at a discount of 60%, 10%, and 2%; $300 at a discount of 50%, 20%, and 1%; and $90 net. What is the net amount of the whole bill?

100. Often a discount series is given instead of a single discount. In this case it may sometimes be more convenient to reduce the series to an equivalent single discount before performing operations.

101. To change a discount series to a single discount.

RULE. — *Take* 100% *as the base. On this base find the first percentage of the series, and subtract this percentage from the* 100%. *Find the second percentage of the series on this remainder and subtract this percentage from this remainder, and so continue till all the discounts have been taken. The last remainder will be the per cent. of net proceeds. Subtract this per cent. of net proceeds from* 100%, *and the remainder will be the single discount.*

EXAMPLES.

What single discount is equivalent to the series —

1. 10% and 5%?
2. 10% and 10%?
3. 10%, 10%, and 5%?
4. 10%, 10%, 5%, and 2%?
5. 20%, 10%, and 5%?
6. 25%, 20%, and 10%?
7. 20%, 20%, and 5%?
8. 15%, 10%, and 5%?
9. 30%, 20%, and 10%?
10. 22%, 10%, and 10%?

102. To find at what price goods should be marked, or listed, in order to give a certain discount on the marked price and net a certain selling price.

RULE. — *Find the % of net proceeds as in Art. 101, Rule. Divide the required selling price by the % of net proceeds.*

EXAMPLES.

At what price must goods be marked to net —

1. $15, after giving a discount of 20%?
2. $5.60, after giving a discount of 16⅔%?
3. $2.50, after giving a discount of 10% and 5%?
4. $9.40, after giving a discount of 20%, 10%, and 5%?
5. $8.20, after giving a discount of 10%, 10%, and 5%?
6. 10% profit, after giving a discount of 20% and 5%, if the cost is $20?

NOTE. — Add the amount of profit to the cost to get the net selling price. Then apply the rule.

7. 12½% profit, after giving a discount of 25% and 10%, if the cost is $18.60?
8. 6¼% profit, after giving a discount of 10%, 10%, and 5%, if the cost is $45?
9. 16⅔% profit, after giving a discount of 30%, 20%, and 10%, if the cost is $75?
10. 10% loss, after giving a discount of 10%, 5%, and 2%, if the cost is $24?

NOTE. — Take the amount of loss from the cost to get the net selling price. Then apply the rule.

11. 5% loss, after giving a discount of 30% and 10%, if the cost is $150?
12. 8⅓% loss, after giving a discount of 15% and 5%, if the cost is $240?
13. 11⅓% loss, after giving a discount of 40%, 5%, and 2%, if the cost is $9.27?

PRACTICE.

103. *1.* A man sells goods at a dollar a yard, and makes 25% profit. What should be his marked price of the same goods in order to discount 10% and make the same profit? What did the goods cost?

2. Cloth costs 90c. per yd. What must be the marked price in order to discount 20% and make 25% profit?

3. When brooms are $5 per doz., with a discount of 5% on bills over $100, what will be the cost of 16½ gross?

4. Goods that cost $500 are marked up 25%, but are sold at a discount of 15% on the marked price. What is the gain %?

5. A cabinet-maker has furniture that cost him $450. How shall he mark it so as to discount 20% and 10%, and net 20% profit?

6. I am about closing out my business, and am willing to sell goods that cost me $7.50 at a 10% loss. What must be my marked price in order to net this loss, after allowing a discount of 20% and 5%?

7. I buy goods for $20, mark them up 20%, and sell them so as to net cost. What % of discount do I give?

8. I buy goods for $400 and mark them at $500. I sell these goods at 10% discount. What is my % of profit?

9. Goods that cost $1 are purchased at 25% discount. At what price must the purchaser mark them so as to make a profit of 25%, after allowing a discount of 25%?

10. I wish to mark goods that I purchased at 20% discount so that I may discount 20% and make 20% profit on my cost. What % of the original list price ought my list price to be?

11. I buy goods for $1200, and borrow the money to pay for them on my 3 mos. note at 6% interest. How must I mark these goods in order to cover cost, interest, an expense of $20, and 15% profit on total cost, if I wish to allow a discount of 10%?

12. Bill of Dry Goods:

58 BEDFORD ST., BOSTON, July 8, 1907.

Messrs. J. B. HAM & Co.,

Bought of PERCY V. JORDAN.

TERMS: *10d. 8%.*

All goods remaining in Storage are at the risk of the Purchaser.

M CW P J	#1832	St. W. 176 —				
		38-in. Cotton and Wool Foule.				
		40 pcs.	2122½	.20	$***	**
		1/10 2/10 3/10 4/10				

How much will settle the above bill July 18, no interest being deducted?

13. Bill of Dry Goods:

BOSTON, June 8, 1907.

Messrs. J. W. JONES & Co.,

Bought of FLEET, STRONG, & FLEET,

35–39 Franklin St., Boston.
42–45 Church St., New York.

TERMS: *10 days. Aug. 7.*

M M	5	Pcs. 48-in. Tricot, 179⅝	.45	**	**
			6%	4/4	
		1/127 1/125 1/130 1/127 1/165		$***	**

How much will settle the above bill June 30? Aug. 7? Interest is allowed in each case at 6% for the unexpired time.

14. Bill of Dry Goods:

(Positively no goods taken back when cut.)

Book 12.
Page 208.

PHILADELPHIA, March 2, 1907.

MR. CHAS. G. LANGDON,

Bought of SMITH, WHITE, & CO.,

182 and 184 Broome St.
P. O. Box 1487.

TERMS: { *10 days, 2%.* / *30 days, 1%.* / *60 days, net.* } Payable in gold.

All claims for damages, deficiencies, or errors to be made within 10 days.

A. B. W. #75	10 pcs. 40-in. Cassimere, St. 214. 55^6, 56^7, 59, 59 56^6, 56^7, 56^7, 54^4 } 570⅛ yds. . . 56^7, 58		.53	$\$***$	**

No discount for unexpired time other than that given in "Terms," what will settle the bill March 12? March 31?

15. Bill of Trunk-Tacks:

ARLINGTON, MASS., Aug. 10, 1907.

Messrs. J. H. WRIGHT & Co.,

Bought of R. S. FRENCH & SONS.

TERMS: *10% discount for cash, if paid by the 20th of the month following the month of sale. 2% additional discount will be made for cash if paid on or before the 6th of next month.*

25 lb. 1 Tin'd Trunk . . .24	*	**				
25 " 1½ " " . . .20	*	**	**	**		
55%			*	**	*	**
30 lb. 1⅛ × ♯ 6 Trunk Rivets Sample, 256 to the lb. — 7680 — 20c. per 100,			**	**		
30%			*	**	**	**
					**	**
10% Trade					*	**
					$**	**

What will settle the above bill Sept. 20? Sept. 6?

16. Bill of Hardware:

WINCHESTER, MASS., April 10, 1907.

Mr. W. H. BRADFORD,

Bought of J. W. SELIGMAN.

TERMS: *Net cash, 30 days. No discount if paid in shorter time.*

5 Gr. Pict. H'ks, 780, 1.30	*	**			
3 " " " 820, 1.50	*	**			
	**	**			
50%, 10%, 10%	*	**	*	**	
3 " " Knobs, 62, .80	*	**			
45%	*	**	*	**	
20 " " " 7, 1.50	**	**			
15 " " " 9, 1.75	**	**			
5 " Screw Hooks, 40, .67	*	**			
5 " Cup " 46, .70	*	**			
	**	**			
75%	**	**	**	**	
			$**	**	

How much is the net amount of the above bill at the end of 30 days?

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]								
[illegible]								

PROFIT AND LOSS.

104. PROFIT AND LOSS is a commercial term which means the gain and loss arising from business transactions.

NOTE 1. — The profit or loss is found by comparing the cost of the goods with the selling price, and is usually regarded as being at a certain % on cost. This subject is, then, but a business application of the principles of Percentage. The cost is the Base; the gain or loss is the Percentage; and the selling price is the Amount or Difference, — Amount, if the goods are sold at a gain; Difference, if they are sold at a loss.

NOTE 2. — The *gross cost* is the first, or net cost plus all expenses of the purchase, and is taken as the base or cost on which to compute the gain or loss. The *net selling price* is the selling price minus all expenses. The difference between *gross cost* and *net selling price* is the gain or loss.

105. To aid the pupil a few simple rules are given. It is not intended that each problem given shall be solved by *one* of these rules alone, for some problems may call for the use of several rules, and when to use them is left to the pupil's acuteness in comprehending the conditions of the question.

Before working an example a study of the statements in all their relations to each other must be made. Application of the principles of book-keeping will often help to secure correct results and the pupil is advised to adopt this method as outlined in the following example.

EXAMPLE.

Purchased coal at wholesale at \$4.20 per ton (long ton) and sold it for \$5.00 a ton (short ton). What was the gain and gain %?

SOLUTION.

Cost of 2240 lbs.,	\$4.20	Selling Price of 2000 lbs.,	\$5.00
Gain,	1.40 *Ans.*	Selling Price of 240 "	.60
	\$5.60	Selling Price of 2240 "	\$5.60

Gain \$1.40 ÷ Cost \$4.20 = 33⅓% = Gain%. *Ans.*

106. PROFIT AND LOSS is that part of Percentage which treats of gains and losses. The difference between the cost of an article and the amount received for it is the Gain or Loss.

107. The Cost is the *Base*. The Rate % of Gain or Loss is the *Rate*. The Gain or Loss is the *Percentage*. The Selling Price or Cost plus the Gain is the *Amount*. The Selling Price or the Cost minus the Loss is the *Difference*.

108. Given Cost and Rate % to find Gain or Loss.

FORMULA. — Cost × Rate % = Gain or Loss.

RULE. — *Multiply the Cost by the Rate %, and the product will be the Gain or Loss.*

109. Given Cost and % of Gain or Loss to find the Selling Price.

FORMULA. — Cost × $\left\{\begin{matrix} 100\% + \text{Gain} \\ 100\% - \text{Loss} \end{matrix}\right\}$ = Selling Price.

RULE. — *Cost multiplied by 100% + the Gain = Selling Price.*
Cost multiplied by 100% — Loss = Selling Price.

110. Given Cost, Gain or Loss to find Rate.

FORMULA. — Gain or Lost ÷ Cost = Rate %.

RULE. — *Divide the Gain or Loss (reduced to hundredths) by the Cost, and the quotient will be Rate % of Profit or Loss.*

111. Given Gain or Loss and % of Gain or Loss to find Cost.

FORMULA. — Gain or Loss ÷ Rate % = Cost.

RULE. — *Divide the Gain or Loss by the Rate % and the quotient will be the Cost.*

112. Given Selling Price and Rate % of Gain or Loss to find the Cost.

FORMULA. — Selling Price ÷ $\left\{\begin{matrix} 100\% + \text{Rate \% of Gain} \\ 100\% - \text{Rate \% of Loss} \end{matrix}\right\}$ = Cost.

RULE. — *Divide the Selling Price by 100% plus the Rate % of Gain, or 100% minus the Rate % of Loss, and the quotient will be the Cost.*

EXAMPLES.

113. *1.* If I buy cloth at \$4.50 per yd. and sell it at 20% loss, what is my selling price?

2. Bought hats at \$30 per doz. and sold them at 25% profit. What was the selling price per hat?

3. A house and lot cost \$4500, and was sold at 8% loss. What was the selling price?

4. Sold dry goods at a loss of \$350. The rate of loss was $3\frac{1}{2}\%$. What was the cost? What was the selling price?

5. Melons that cost \$7.50 per 100 were sold at 12c. apiece. What was the gain % if 10% of them were lost by decay?

6. Bought a horse for \$450, and sold him for \$500. What was my gain %?

7. Sold a horse that cost \$500 for \$450. What was my loss %?

8. I sell goods at a profit of 15% and make \$85.45. What is my cost? Selling price?

9. How much is the loss on goods sold at \$1680.80 at a loss of 16%?

10. Tea is bought at $37\frac{1}{2}$c. per lb. At what price must it be sold to gain 20%?

11. My marked price is 30% above cost and I allow $12\frac{1}{2}\%$ discount on sales. What is my % of gain?

12. By selling goods for \$150 I lose $16\frac{2}{3}\%$. At what price should I sell them to gain $16\frac{2}{3}\%$?

13. Flour sold at \$6.50 nets me a profit of 30%. What would be my % of gain or loss if sold at \$6?

14. Sold a carriage for \$90 at a gain of $12\frac{1}{2}\%$, and with the proceeds purchased another which I sold at 10% loss. What was my gain or loss % by both transactions?

15. I buy books at a discount of 40% from list price. What % do I gain by selling at list price?

16. Slates cost \$11.52 per gross, less 10% and 1%. At what price per doz. should they be sold to gain $33\frac{1}{3}\%$?

17. My retail price of fans is \$2.50 each, by which I gain 25%. I sell the same quality of fans at wholesale at \$33 per

doz., less 12½% and 12%. Do I gain or lose at wholesale prices? How much per fan?

18. A coal dealer purchased coal at wholesale at $4.20 per long ton and retailed it by the short ton at $5. What was his gain %?

19. Bought 5 bbls. kerosene oil, each containing 58 gals., at 7c. per gal., paid drayage $1.45, and retailed it at a gain of 66⅔%. What did I get per gal.?

20. A stationer bought 3 bundles of paper at $2 per ream, and retailed it at the rate of 3 sheets for 2c. What was his gain %? Total gain?

21. A fruit dealer bought 120 crates of fruit at 90c. per crate, and sold 30 crates at $1.20 per crate, 20 crates at $1.15 per crate, 50 crates at $1.25 per crate, 10 crates at cost, and threw away the remainder as worthless. What was his total gain and gain %?

22. A sold a store to B for $9468, at a loss of 10%. B expended $1000 in repairs, and sold it for 10% more than A paid for it. Find A's loss and B's gain.

23. Sold 20% of a lot of flour at 20% loss and the remainder at 20% gain. What was the cost of the flour if my total gain was $96.48? What was the amount of sales?

24. A grain dealer purchased 1500 bu. corn at 65c. per bu., and 900 bu. oats at 33⅓c. per bu. He sold 66⅔% of the corn at a loss of 20% and the balance at a gain of 11⅑%. What should he ask per bu. for the oats to net 10% profit on the cost of both?

25. A provision dealer purchased 20 bbls. of apples at $1.50 per bbl., 50 bu. potatoes at 50c. per bu., and 250 lbs. of Marblehead squashes at 2½c. per lb. He sells 10 bbls. of the apples at $1.87½ per bbl., finds 1 bbl. worthless, and sells the rest at 5% gain. He is obliged to throw away 5 squashes weighing 8 lbs. each, but retails the remainder at 5c. per lb. He sells the potatoes at such a price as will make a net profit of 20% on all the purchase. What was the price per bu.?

26. How much should be asked per lb. for fish that cost $3.75 per cwt. to cover a 20% profit and 10% waste?

27. A book agent sold two books at $5 each. On one he

made 50% and on the other he lost 50%. Did he gain or lose on both transactions? How much? What % ?

28. If I buy goods at \$3 with 5% off and sell for \$3.20 with 5% off, what % of profit do I make?

29. Buy coffee at \$24 per cwt. and chicory at \$10 per cwt. Mix them, using 5 of coffee to 2 of chicory. Sell mixture at 30c. per lb. Find the gain %.

30. Bought goods at \$5 a gross, less 20%, and sold them at 50c. per dozen, less 25%. What is my per cent. of gain or loss?

31. Bought goods for \$2000, and in one year sold the same for \$2155, and paid \$95 for storage. Did I make more or less than by putting the money at interest at 6%? What per cent. did I gain or lose?

32. By selling 25 lbs. of sugar for \$1 I lost 20%. What was the cost per lb.?

33. Bought 9 cwt. 30 lbs. coffee for \$285. For what must I sell it per lb. to gain 15% ?

34. Coffee which costs 24c. per lb. was marked for sale at 30c.; it was afterward marked up 5%, at which price 200 bags, of 165 lbs. each, were sold. The purchaser, failing before settlement was made, compromised at 80c. on the \$1. Did the seller gain or lose? How much per lb., and what % ?

35. A coal dealer bought 275 long tons of coal at \$6 per ton, paid charges \$595, and sold it by the short ton at \$9.50. What was his net gain and gain % ?

36. Bought goods amounting to \$6845, and after paying charges, \$65, I sold them at 12½% advance, and took in payment a 60-day note which I had discounted at 6%. What was my gain and gain % ?

37. A man imports 60 pieces of broadcloth, of 14 yds. each, at \$2.75 per yd. The duties and other charges amount to \$640. At what price per yd. must he sell it to gain 15% ?

38. If I buy flour at \$8.50 per bbl. and retail it at 20 lbs. for \$1, what is my gain % ?

39. What % of profit do peaches pay at 2c. apiece, if they cost 60c. per 100 and 10% are lost by decay?

40. I sold goods to a retailer at 60% profit, but before settlement my customer failed, paying only 12½c. on the dollar. Find my loss %.

41. A clothier gains 25% by selling cloth at $5 per yd.; but, a bale of 80 yds. being damaged, he reduces prices on same 10%. What is his gain and gain % on this bale?

42. A grocer has tea which he must sell at 84c. per lb. to gain 40%. He mixes it with another tea costing him 54c. per lb., using 7 of the better to 3 of the poorer kind, and sells the mixture in 10-lb. packages at $7.76. Find his gain %.

43. An article which cost $95.76 per cwt. of 112 lbs. retails at $1.08 per lb. Allowing 5% for waste, what is the % gain?

44. Gave a customer 15 % discount on goods I had marked at 60 % above cost. The customer paid me $6.80. How much was my gain?

45. Buy a lot of apples at 5 for 2c. and sell half of them at two for a cent and the remainder at three for a cent. Find your gain %.

46. Bought coffee at 12c. per lb. For how much per lb. should I sell it to net 14% gain, and allow for 5% loss in roasting and 10% of the sales in bad debts?

47. A grain dealer who has been selling oats in 2-bu. bags at 99c. per bag made 12½% by so doing. He cuts the price so that his gain is 3c. per bu. What % must his sales increase to show same amount of gain as before?

48. A merchant marked a piece of carpeting 25% more than it cost him, but, anxious to effect a sale, and supposing he should still gain 5%, sold it at a discount of 20% from his marked price. Did he gain or lose?

49. My goods are marked to sell at retail at 40% above cost. I furnish my wholesale customers at 12% discount from the retail price. What % profit do I make on goods sold at wholesale?

50. My retail price for broadcloth is $4.75 per yd., by which I make a profit of 33⅓%. I sell a wholesale customer 100 yds. at a discount of 30% from the retail price. What % do I gain or lose, and what do I receive per yd.?

51. A merchant asked for a quantity of dried fruit 22%

more than it cost him, but, it being a little mouldy, he was obliged to sell it for 10% less than his asking price. He gained $98 by the transaction. How much did the fruit cost? For how much did he sell it? What was his asking price?

52. I bought a horse of Mr. A for 15% less than it cost him, and sold it for 30% more than I paid for it. I gained $15 in the transaction. How much did the horse cost Mr. A? How much did it cost me? For what did I sell it?

53. By selling Java coffee at 18 cts. per lb. I make a profit of 20%. For how much must I sell it to make a profit of $16\frac{2}{3}\%$?

54. The cost of purchasing and transporting a quantity of goods from New York to Chicago is 9% of the first cost of the goods. If a merchant in Chicago wishes to make a profit of 25% on the full cost of the goods, what % gain on the *first cost* must he ask for them? What amount of goods must he purchase in New York to realize a profit of $3625 on the *first cost?* What would be the real profit on full cost?

55. What must be the asking price of cloth costing $3.29 per yd., that I may deduct $12\frac{1}{2}\%$ from it, and still gain $12\frac{1}{2}\%$ on the cost?

56. I bought a lot of coffee at 12 cts. per lb. Allowing that the coffee will fall short 5% in weighing it out, and that 10% of the sales will be in bad debts, for how much per lb. must I sell it to make a clear gain of 14% on the cost?

57. What must be the asking price of raisins costing $7.364 per box, that I may fall 10% of it and still gain 10% on the cost, allowing 10% of sales to be in bad debts?

58. Bought a horse for $\frac{4}{5}$ of the amount I sold him for, paid $\frac{1}{4}$ of the cost for his keeping and sold him for $250. What % did I gain or lose on the investment?

59. I sold two houses at $5000 each. On one I gained 20% and on the other I lost 15%. What was the gain or loss?

60. A grocer purchased 300 bbls. of apples at \$1.50 per bbl. and sold 100 bbls. at a gain of $33\frac{1}{3}\%$, and 75 bbls. at a gain of 25%. At what price per bbl. must he sell the remainder to gain 20% on the cost?

61. I sold a boat for \$2500, thereby losing $33\frac{1}{3}\%$, and invested the proceeds in real estate, on which I lost $12\frac{1}{2}\%$. I invested the proceeds from this sale of real estate in stocks, on which I lost $16\frac{2}{3}\%$. How much did I lose? What was my % of loss?

62. If oranges cost \$2.00 per 100, at what price must they be marked to gain 25% and make allowance for 30% decay and 15% bad debts in selling?

63. A sells two horses to B, and gains $33\frac{1}{3}\%$. B sells them to C at a gain of 25%. C sells them to D for \$896, making a profit of 20%. How much did A pay for the horses?

64. Purchased 5 tons coal at wholesale at \$4.80 per long ton and sold it for \$5 per short ton. What was the gain and gain %?

65. My retail price of gloves is \$3.75 per pair, by which I make 25% profit. I sell the gloves at \$56 per dozen pairs less $12\frac{1}{2}\%$ and $14\frac{2}{7}\%$. What was my gain on each pair and gain %?

66. A sold a horse to B at 20% less than it cost him. B sold the horse at a gain of $33\frac{1}{3}\%$. What did this horse cost A? How much did B receive if he gained \$25? How much did it cost B?

67. A merchant bought goods which he sold at $12\frac{1}{2}\%$ gain on full cost after paying freight and other expenses equal to $12\frac{1}{2}\%$ of the cost of the goods. He received 70% of the price in cash and a sixty-day note for the remainder at 6%. If the face of the note was \$3000, what was the full cost of the goods, and what was the gain in dollars?

68. A firm sold during the year 1906 goods to the amount of \$80,000. On $\frac{1}{2}$ of these goods a profit of 20% was realized, and on the remainder there was a profit of 25%; during the year 1907 goods to the amount of \$90,000 were sold, $\frac{1}{8}$ of

which sold at a profit of $16\frac{2}{3}\%$, $\frac{1}{3}$ at a profit of $33\frac{1}{3}\%$ and the remainder sold at a loss of 10%. Find the whole cost of the goods, the total gain and the gain per cent. for the two years.

69. The selling price of a carriage was \$250, or 25% in advance of cost. By selling to the retailer, the jobber realized a profit of 20%; and by selling it to the jobber, the manufacturer made a profit of $16\frac{2}{3}\%$. What did the carriage cost the manufacturer?

70. I sold two automobiles for the same price. On one I gained 25%, and on the other I lost 25%. My total loss was \$400. What was the cost of each? What was the $\%$ of loss?

71. Sold a house and lot for \$2800 (house \$2000, lot \$800). By so doing I lost 20% on the house and gained 25% on the lot. What was the cost of each and what was the gain or loss?

72. The profit on a sale of butter was 20% and the sum received for the butter was invested in eggs, which were sold at $33\frac{1}{3}\%$ profit. What was the gain on the butter, if the gain on the eggs was \$96?

73. Sold a horse and a carriage for \$650, receiving 140% more for the horse than for the carriage. Gained 25% on the horse, and lost 20% on the carriage. What was my total gain or loss, and what $\%$?

74. Bought two horses for \$225 each. Sold the first at a gain of 25%. The selling price of the second was 125% of the selling price of the first. Required, selling price of each; also gain on each.

75. The sum paid for two farms is \$9310. 80% of the sum paid for the first farm equals 120% of the sum paid for the second farm. The first farm was sold at a gain of 25%, the second at a loss of $33\frac{1}{3}\%$. What was the gain or loss $\%$?

76. I sold tea and sugar at a total gain of \$7.54, the gain on the sugar being 45% of the gain on the tea. What was my gain on each?

77. Sold an invoice of books at 25% profit, and with the sum received therefor purchased ink which I sold at 30% profit. My gain on both was $32.81¼. What did I receive for the ink?

78. One of a pair of horses was sold for $250 at a gain of 25%. The other was sold for $200 at a loss of 20%. What did the pair cost?

79. A fruit dealer purchased 100 crates of strawberries at $3.20 per crate. If there are 32 boxes of berries in each crate, for how much must he sell each box to gain $156 on the whole transaction?

80. A farm of 360 acres was bought for $20 per acre; $1200 was expended on the land in improvements. At how much per acre must it be sold to realize a profit of 33⅓%?

81. Twenty carloads of coal, of 25 tons each, were purchased at $4.50 per ton (long ton). It was sold at $6.50 by the short ton. What was the gain on the whole amount?

82. A grain dealer sold a quantity of wheat and corn and received $4250 from the sale of both. He gained on the wheat 16⅔% and on the corn 14⅔%. He received for the corn 120% more than for the wheat. What was the gain?

83. Bought 20 yds. of cloth at $3.20 per yd. and 40 yds. of silk at $4.60 per yd. Sold the silk at 12% loss. For how much must I sell the cloth to gain 30% on the entire cost?

84. I sold a house and lot for $7900, and gained 20% on the house and 25% on the lot. The lot sold for 125% more than the house sold for. How much was the gain on each and what was the cost of the house and the lot?

85. Two men invested $3500, and a gain of $750 was made. If of this gain the share of one was $75 more than that of the other, what part of the $3500 did each invest?

86. What must be the asking price of silk costing $4.75 per yd. that I may deduct 12½% from it, and still gain 12½% on the cost?

87. I purchased 200 head of cattle at \$40.25 per head; 100 head at \$39.75, and 50 head at \$40. I sold them for \$15770.25. What % of gain was made?

88. A merchant purchases goods to the amount of \$6500. Freights and other expenses amounted to \$200. For how much must he sell these goods to make a profit of 20% after allowing 10% for bad debts?

89. Transportation on an invoice of goods was 20% of the cost of the goods. The goods sold for 25% gain on full cost. The gain was \$4500. What was the full cost?

90. Sold a watch for \$96, gaining 20%. With the proceeds I purchased another which I sold at a loss of $12\frac{1}{2}$%. What was my gain or loss % by both transactions?

114. Considering each of the following columns as a separate question, if the terms marked √ are given, how may the term marked ? be found?

	1	2	3	4	5	6	7	8	9	10	11
Cost.....	√	√	?	?	?	..	√	√	√	√	?
Rate of profit	√	√	√	√	..	√	..	..	?	?	√
Profit	?	..	√	..	√	?	√	?	..	√	..
Selling price at a profit	..	?	..	√	√	√	?	√	√	√	√

	12	13	14	15	16	17	18	19	20	21	22
Cost.....	√	√	?	?	?	..	..	√	√	..	√
Rate of loss.....	√	√	√	√	..	√	√	..	?	?	?
Loss.....	?	..	√	..	√	?	√	?	..	√	√
Selling price at a loss.	..	?	..	√	√	√	?	√	√	√	..

COMMISSION AND BROKERAGE.

115. COMMISSION or BROKERAGE is an allowance made to an agent for transacting business for another; as, for buying or selling property, for collecting or investing money, etc.

116. The agent is generally known in business as a COMMISSION MERCHANT, or a BROKER, and the person for whom he acts is called the PRINCIPAL.

NOTE. — The COMMISSION MERCHANT usually takes possession of the goods bought or sold, and operates in his own name. A BROKER does not have possession of the goods, but is simply the means of making contracts in the name of his PRINCIPAL. The term BROKER is generally applied to one who buys stocks, bonds, bills of exchange, notes, etc.

117. The GROSS PROCEEDS of a sale is the sum received by the agent for the goods.

NOTE. — The agent's commission is *computed at a certain rate % on the gross proceeds*, and *is the first expense of the sale to be deducted.* What is left after deducting the commission and other expenses is called the *Net Proceeds.*

118. The NET, or PRIME COST, is the cost of the goods before commission or other expenses have been added.

NOTE 1. — The agent's commission is *computed at a certain rate % on the net cost*, and *is the first expense to be added.* The sum of net cost, commission, and all other expenses is called the GROSS COST.

NOTE 2. — When an agent sells goods and has the net proceeds in his possession, he is sometimes ordered to invest the money he holds in goods to be consigned to the principal. In this case, if he is to pay expenses, he *first deducts the estimated expenses*, and then *divides the remainder by 100%+ his rate of commission.* The quotient is the net cost. His commission is the difference between the quotient and the dividend. In other cases (when the agent holds none of the principal's money) it is customary for the agent to purchase and charge the principal with the commission, while the person who sold the goods renders his bill and draws on the principal for the amount.

119. GUARANTY is a percentage paid the agent in addition to his commission for becoming responsible for the payment for goods sold.

120. Commission and Brokerage is an application of the principles of Percentage. The GROSS PROCEEDS, or NET COST, is the BASE; the Commission is the Percentage.

NOTE. — Sometimes the commission is not found at a per cent. of the value, but at so much per unit of quantity, as, grain per bushel, cotton per bale, etc.

121. Given the Purchase or Sales and the Rate % to find the Commission or Brokerage.

FORMULA. — Purchase or Sales × Rate % = Commission or Brokerage.

RULE. — *Multiply the amount of the Purchase or Sales by the Rate %, and the product will be the Commission or Brokerage.*

122. Given the Purchase or Sale, and Commission or Brokerage to find the Rate %.

FORMULA. — Commission or Brokerage ÷ Amount of Purchase or Sales = Rate %.

RULE. — *Divide the Commission or Brokerage by the amount of Purchase or Sales, and the quotient will be the Rate %.*

123. Given Commission or Brokerage and the Rate % to find the Purchase or Sales.

FORMULA. — Commission or Brokerage ÷ Rate % = Amount of Purchase or Sales.

RULE. — *Divide the Commission or Brokerage by the Rate %, and the quotient will be the amount of Purchase or Sales.*

124. Given the sum expended or Net Proceeds and the Rate % to find the Purchase or Sales.

FORMULA. — $\left.\begin{array}{l}\text{Sum expended} \div (100\% + \text{Rate \%}) \\ \text{Net Proceeds} \div (100\% - \text{Rate \%})\end{array}\right\} =$ Amount of Purchase or Sales.

RULE. — *Divide the sum expended by 100% + the Rate % of Commission or Brokerage, or divide the Net Proceeds by 100% minus the Rate % of Commission or Brokerage, and the quotient will be the amount of Purchase or Sales.*

125. To find the net amount to be invested when the agent has the purchase money: From the sum given deduct

all known expenses other than Commission, and divide the remainder by 100% + rate of Commission or Brokerage.

126. To find gross cost of a purchase: Add Commission and all other expenses to the Net Cost.

127. To find the net proceeds of a sale: Subtract Commission and all other expenses from the Gross Proceeds.

128. Sum expended ÷ 100% + Rate % = Net Cost.
Net Proceeds ÷ 100% — Rate % = Gross Proceeds.

RULE. — *Divide the sum expended by 100% + Rate %, and the quotient will be the Net Cost.*

Divide the Net Proceeds by 100% — Rate %, and the quotient will be the Gross Proceeds.

129. Commission or Brokerage = $\left\{\begin{matrix}\text{Gross Proceeds}\\ \text{Net Cost}\end{matrix}\right\}$ × Rate %.

RULE. — *Multiply the Gross Proceeds (sum received by the agent for the goods) or Net Cost by the Rate %, and the product will be the Commission or Brokerage.*

130. Commission or Brokerage ÷ Amount of purchase or sales = Rate %.

RULE. — *Divide the Commission or Brokerage by the Gross Proceeds or by the Net Cost, and the quotient will be the Rate %.*

131. Commission or Brokerage ÷ Rate % = Gross Proceeds or Net Cost.

RULE. — *Divide the Commission or Brokerage by the Rate %, and the quotient will be the Gross Proceeds or Net Cost.*

EXAMPLES.

132. *1.* My agent sells goods for $1800, and charges me 3% commission. What amount should he remit to me?

2. An agent sells goods for $2648. His commission is 2½%, and charges for storage, etc., amount to $125. What are the net proceeds?

3. I sold for a firm in Chicago a consignment of 950 bu. corn at 60c. per bu., and 120 bbls. pork for $11.75 per bbl. My commission on the corn was 1½c. per bu., and on the pork 2½%.

The charges were for freight, storage, etc., \$195. What were the net proceeds due the firm?

4. My agent purchased for me merchandise amounting to \$3750 at 2% commission. For what sum should he draw on me?

5. I bought for a lumber firm in New York 43560 ft. of pine lumber at \$15.50 per M.; 28175 ft. of hemlock boards at \$14 per M., and 35250 ft. of spruce lumber at \$16.80 per M. My commission was 3½%, and other charges \$245. What is the gross cost of my purchase?

6. An agent remitted \$4168.80 as the net proceeds of a consignment on which his commission was \$151.20. What was the rate of commission?

7. I received from my agent in South America \$4957.50 as the net proceeds of a consignment of flour which he sold at \$7.25 per bbl. His commission was \$217.50, and charges for freight \$212.50, and drayage and storage \$50. What was the rate of commission, and how many bbls. did he sell?

8. I bought goods for a firm in Portland on which the charges were, for cartage, \$21.50; storage, \$31, and for commission, \$112.50. My entire bill was \$5165. What was the rate of commission?

9. I paid a real-estate broker \$175 for selling a house and lot. This sum included his 5% commission, and other expenses \$50. What sum did I realize from the sale?

10. An agent sold 310 bbls. of flour at \$5.75 per bbl., and 1245 bu. of corn at 62½c. per bu. He paid expenses \$75, and after deducting his commission remitted \$2357.60 as the proceeds. What was the rate of commission?

11. A commission merchant received \$12500 to invest in cotton after deducting 5% commission. How many bales of 400 lbs. each can he purchase at 35c. per lb.?

12. I shipped to Baltimore 850 tons of hay, which my agent sold at \$22.50 per ton. He paid charges: For freight, \$950; cartage, \$112.50; storage, \$65. His commission was 2½%. What is due me?

13. My agent in St. Louis has sold for me lumber amounting to \$22850, charging me 3% commission. One-half the

proceeds he remitted to me by draft, charging ¼% brokerage, and with the other half he purchased molasses at 40c. per gallon, and charged 2% commission. How many hogsheads of 63 gals. each did he ship to my order, and what was the face of the draft?

14. I pay an agent ½% commission for selling a quantity of cloth at $1.50 per yd. How many yards were sold if the commission was $3.27¾? What was the net proceeds?

15. A commission merchant sold 4500 bushels of wheat at $1.60 per bu., paid 25c. per load of 50 bu. for drayage, and $2.80 for insurance and 1c. per bu. for storage. Out of the proceeds he purchased 2000 lbs. coffee at 24c. per lb., 6000 lbs. sugar at 7¼c. per lb., and 8000 bu. salt at 47½c. per bu. What balance does the agent hold to the principal's credit if the commission was 2½% on sale and the same % on the purchase?

16. A broker charged ¾% for buying coffee, and his brokerage was $94.80. He afterwards sold the same coffee at ½% brokerage, and it was found that the net profit from the transaction was $946.45. What did the coffee sell for?

17. I ordered my agent to buy ham at 2½% commission, and paid him $52.50 for his services. I afterward sold this ham at 12% profit, and gained at the rate of $1.722 per cwt. How many pounds of ham were sold?

18. Sold through my agent in Chicago a consignment of leather goods and requested that he buy for me out of the proceeds 2500 bu. corn at 80c. per bu. His commissions were 4% for selling and 2% for buying. He remitted to me as balance due $1125. Find the commission on sale.

19. A commission merchant in New Orleans purchased cotton for a manufacturer in Lowell to the amount of $16576. What is his commission at 2½%?

20. My agent charges me $25 for collecting $800. What is his rate of commission?

21. An architect charges ⅜% for plans and specifications, and 1½% for superintending a building which cost $32000. What is his fee?

22. I collected 65% of a note of $87.50, and charged 5% commission. What is my commission and the sum paid over?

23. My agent in Baltimore has purchased goods for me to the amount of $1250, for which he charges a commission of $1\frac{3}{4}\%$. What sum must I remit to pay for goods and commission?

24. Sent to my agent in Cincinnati $765 to purchase a quantity of bacon; his commission is 2% on the purchase, which he is to deduct from the money sent. What is his commission, and what does he expend for bacon?

25. I have received $11200 from my correspondent in Boston with directions to purchase cotton, first deducting my commission, $2\frac{1}{2}\%$. What is my commission, and how much must I expend for cotton?

26. My agent at Chicago writes that he has purchased for me 4000 bushels of wheat at 80 cts. a bushel, and wishes me to send him a check on New York, which he can sell to a broker for a premium of $\frac{3}{4}\%$. How large a check shall I send him, his commission being 3%?

27. Field & Parsons sell for H. Johnson & Co., 3500 lbs. of butter at 20 cts. a lb., 2580 lbs. of cheese at 9 cts. per lb., at a commission of 5%. They invest the balance in dry goods, after deducting their commission of $2\frac{1}{2}\%$ for purchasing. How many dollars' worth of goods do Johnson & Co. receive? What is the entire commission of Field & Parsons?

28. An agent bought on account a quantity of copper at 20 cents per lb. How much must I remit the agent to cover the cost of purchase and commission? How many pounds of copper were purchased, the agent's charges being 5% or $24.60?

29. How much did I realize on the sale of a house and lot sold on commission at 2%, the total charges, including $40 for advertising, being $80?

30. Sold for a manufacturer a bill of dry goods for $2\frac{1}{2}\%$ commission. He paid me 40% of the amount due in

cash, and for the balance of $36.40 I received his note. What was the amount of sales?

31. A broker charged $\frac{1}{4}\%$ for effecting the sale of grain and $\frac{1}{2}\%$ for selling an invoice of coffee. The total brokerage was $30, and 35% of the gross sales was received for the coffee. For how much was the grain sold?

32. The charges on a consignment, including commission, storage, cooperage, weighing, etc., were 5% and the freight $48.78. The charges for selling were $2\frac{1}{2}\%$ or $80. What were the net proceeds?

33. I paid $2\frac{3}{4}\%$ brokerage to an agent for purchasing wheat at $1.10 per bushel. The agent's charges were $8.80. How many bushels did he purchase?

34. A collector paid 80% of a bill and charged $36 for his services. His rate for collecting was 10%. What was the amount of the bill?

35. A received $9000 to invest in tobacco. The market averaged $27\frac{1}{2}$ cents per lb., charging $\frac{3}{8}\%$ for insurance, $\frac{1}{4}\%$ for storage and $2\frac{3}{4}\%$ commission. How many pounds of tobacco were purchased?

36. After deducting 5% commission and $17.25 for storage and cartage, I remitted $1920 to my consignor. What was the amount of sales?

37. I remit my agent $400 with instructions to buy sweet potatoes. He pays $80 for barrels and freight, $3.25 for insurance and charges for buying $2\frac{1}{2}\%$. How many barrels of potatoes can he purchase at $4.50 per barrel?

38. A commission merchant bought an invoice of groceries, for which he charged 3% for buying and paid $30 for freight. The total amount of bill to his customer was $1681.50. What was the amount of groceries purchased?

39. A commission merchant's regular charges were: for selling 3% and for guaranty 2%. The agent effected sales through a broker and paid $1\frac{1}{8}\%$ brokerage. The sum remitted to the consignor was $6842. In addition to the charges of commission and guaranty, $60 was deducted for

storage. What was the amount of sales and commission merchant's gain?

40. Directed my agent in Chicago to purchase livestock on 10 days' credit, at which time I paid for the purchase and charges. The cost of pasturage was $21.60 and the agent's charges $1\frac{3}{8}\%$. How much did he invest in livestock, if the whole bill was $3640?

41. An agent sold an invoice of lumber and charged 4% commission. He invested the proceeds in barley after deducting his commission of $2\frac{1}{2}\%$. The agent's entire commission was $300. How much did he invest in barley?

42. Bought a lot of oats on speculation through a commission merchant. The sum expended was $860, including the cost of the oats and the commission charges of $3\frac{3}{4}\%$. How much was paid for the oats?

43. Remitted an agent $500 for the purchase of hams at 10 cents per lb. The agent's commission was 3% on the purchase price. How many pounds of ham did he purchase?

44. An agent remitted $400 after deducting his commission and other charges from the sales of a shipment. The charges for commission, storage, etc., were $6\frac{1}{4}\%$ of the sales. What was the amount of sales?

45. A commission merchant received from a speculator $3806.25 to invest in corn after deducting his commission of $1\frac{1}{2}\%$, and to store the corn subject to the speculator's order. The anticipated rise in corn taking place, the commission merchant was ordered to sell. He did so, obtaining 80 cents per bushel; and after deducting his commission of $1\frac{1}{2}\%$ for selling and $75 for storage, paid the speculator $3865 as the balance due him. What did the commission merchant pay per bushel for the corn?

46. An agent sold a consignment of coffee at 13 cents per pound, charged 5% commission for selling, invested $1348.62 of the proceeds in corn, including 4% commission, and remitted $380.38 as the balance due his principal. How many pounds of coffee were sold? What was the total commission?

133. Considering each of the following columns as a separate question, if the terms marked √ are given how may the term marked ? be found; and why?

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Gross proceeds.....	√	√	√	?	?	..	?	..	?	?	√	√	√	..	..
Rate of commission..	√	√	√	√	..	?	..	?	√	√	..	?	?	√	√
Commission	?	..	..	√	√	√	√	√	..	..	?	..	..	√	√
Net proceeds.....	..	?	?	..	√	√	√	√	√	√	√	√	√	?	?
Storage	..	..	√	..	..	..	√	√	..	√	..	..	√	..	√
Drayage.....	..	..	√	..	..	..	√	√	..	√	..	..	√	..	√
Freight.....	..	..	√	..	..	..	√	√	..	√	..	..	√	..	√

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Net cost	√	√	√	?	√	?	..	?	..	?	?	√	√	..	..
Rate of commission..	√	√	√	√	?	..	?	..	?	√	√	?	?	√	√
Commission	?	..	..	√	√	√	√	√	√	..	..	..	..	√	√
Gross cost.....	..	?	?	..	..	√	√	√	√	√	√	√	√	?	?
Storage	..	..	√	..	..	..	..	√	√	..	√	..	√	..	√
Drayage.....	..	..	√	..	..	..	..	√	√	..	√	..	√	..	√
Freight.....	..	..	√	..	..	..	..	√	√	..	√	..	√	..	√

TAXES.

134. A TAX is a sum of money assessed upon the person or property of an individual to meet the expense of government, or for other public purposes.

135. A tax levied upon the person is called a POLL or CAPITATION TAX, and in most States is assessed upon all male citizens of 21 years of age, or more.

NOTE. — This tax is levied without reference to property. The term "POLL" is sometimes used for the person on whom it is levied.

136. A tax assessed on property is called a PROPERTY TAX.

137. The property on which taxes are levied is known as REAL PROPERTY and PERSONAL PROPERTY.

138. REAL PROPERTY is that property which cannot be moved, as land, buildings, etc.

139. PERSONAL PROPERTY is movable property, as cash, merchandise, notes, etc.

NOTE. — The expense of town, county, State, and city government is met by a direct tax on persons and their property; while the expense of the general government is met by duties on imported goods; internal revenue tax on tobacco, liquors, proprietary medicines, etc.; sale of public lands; fees of officers; tax on circulation, deposits, and capital of National Banks; etc.

140. The officers chosen to assess the taxes are known as ASSESSORS. It is their duty to make a list of taxable polls and estimate the value of the property on which the property tax is to be raised.

141. A TAX COLLECTOR is a person chosen to collect the taxes.

142. A LICENSE FEE is a sum charged by town, county, State or general government for the privilege of conducting a certain line of business.

143. To Assess Taxes.

RULE.— *Find total amount to be raised. From this deduct all license fees or surplus in the treasury. Divide the remainder by 100 per cent minus collector's fee. From the result subtract the total poll tax. This remainder, if divided by the assessed property of the town will determine the rate of taxation on one dollar.*

EXAMPLES.

1. A certain town votes to raise by taxation $8560. The town contains 500 polls, and the poll tax is $2.50. The taxable property consists of real estate, $628345.42, and personal property, $346321.25. What is the tax per $1, and what is the tax of James Worth, whose real estate is valued at $8240, and personal property $2750, and who pays one poll tax?

2. The assessed value of the real estate of a town is $760000, and of the personal property $500000. The sum to be raised to defray town expenses is $7827.90 net, after allowing 3% for collecting. How much must be collected, and what is the tax per $100, if the town contains 620 polls who pay $1.50 each?

3. The assessed valuation of a town is $1264000. The amounts to be raised by taxation for the expenses of the year are: For schools, $3500; for streets, $2200; for salaries of officers other than that of collector, $1500; for interest on the town debt, $2340; for construction of a bridge, $4000; for collector's fee, $284, and for sundry expenses, $1060. There are 980 polls, who pay $1.00 each. What is the tax-rate per $1000, and what is A's tax, whose real estate is worth $7500 and personal property $2800, and who pays one poll tax?

4. The taxes of the town of A for the year 1907 were levied to cover the following expenses: Support of poor, $1800; State and school tax, $12960; roads and bridges, $3100; county expenses, $1968.44, less a surplus in the treasury, $1140.84; accounts audited by town auditors, $1233.75; incidentals, $1478.65. Of this tax, 560 polls pay $2.50 each, and the estimated revenue from licenses is $1000. The taxable property is, real estate, $879502.50 and personal property $738525. The above estimate does not include the collector's fee of 2%. What is the tax-rate per $100?

5. A certain county has a valuation of $12743825, and the number of taxable polls is 9775. The expenses for a certain year were estimated to be: For schools, $18500; for interest on a debt of $25000 for the year, one-half at 6% and the remainder at 5%; for roads and bridges, $8400; for salaries, $7200; and for other expenses, $14750. The county poll-tax was 75c., and the revenue from licenses, $4200. What rate of tax must be assessed to cover the above expenses and a sinking-fund of $6000?

6. The value of the real estate in a certain town is $2385000; personal property, $865000. A poll-tax of $2 is assessed on each of 935 persons. The town votes to raise for schools, $12000; roads and bridges, $4000; support of poor, $3000; pay of town officers, $800; interest on debt, $320; fire department, $1000; contingent expenses, $3500. How much tax will be paid by A, who has $3800 worth of real estate and $5000 personal property, but is a non-resident of the town?

7. A town with a valuation of $3000000 in real estate and $1500000 in personal property raised the following sums by taxation: $18000 for roads; $26000 for schools; $6000 for a bridge; $3000 for county expenses; $9000 for sinking fund; $30000 for a public building; and $9560 for interest on town debt. There were 1560 poll taxes of one dollar each, 20 licenses of $1500 each were granted by the town, and there was an unexpended balance in the treasury of $8750. The collector received $2\frac{1}{2}\%$ for collecting the taxes and this amount is not included in the above sums. What is the tax per $1000?

DUTIES.

144. DUTIES or CUSTOMS are taxes assessed by the general government upon imported merchandise to produce a revenue for support of the government and for the protection of home industry.

145. CUSTOM-HOUSES are branches of the Treasury Department established by Congress at certain places on the shores and boundaries of the United States for the collection of duties and for entry and clearance of vessels.

NOTE. — The boundaries of the United States are divided into collection districts, in each of which there is a port of entry and one or more ports of delivery. Thus, the District or Port of Boston and Charlestown includes the shores of the counties of Middlesex, Suffolk, and Norfolk. All entries of goods, and estimates and payment of duties thereon, must be made at Boston, after which the goods may be delivered at any one of the following ports of delivery: Boston, Medford, Cohasset, Hingham, Weymouth, Cambridge, Roxbury, and Dorchester. A Deputy Collector is stationed at Cohasset. All ports of entry are also ports of delivery. Vessels must be entered and cleared at the port of entry.

146. An INVOICE or SHIPPERS' MANIFEST is an itemized bill of the goods, showing the quantity, quality, and price of the goods, as also all charges and the names of consignor and consignee, etc.

NOTE 1. — All invoices are required to be made in the weights, measures, and moneys of the country in which the purchase is made. To change these moneys to U.S. money, use is made of a table showing the values of foreign moneys as proclaimed each year by the Secretary of the Treasury. (P. 125.)

NOTE 2. — The Consul of the U.S. at the foreign port makes two copies of the original invoice, one to send to the Collector of the port at which the goods are to be entered, and one to keep on file. He also makes a certificate as to the quantity and value of the goods, and, when no value has been proclaimed for the money in which the invoice is made, he certifies to that also.

NOTE 3. — The government requires that the invoice shall show five classes of charges, when so many occur, viz., 1, Market Price of the Goods; 2,

Carriage to Shipping Port; 3, Shipping charges; 4, Cases and Packing; 5, All other charges.

147. The following are the principal entries made at the Custom-House: Import entry for immediate consumption; import entry for storage in a bonded warehouse; import entry for transportation to another port of entry (duties assessed and paid at the latter port); import entry for immediate transportation to a foreign country (no duties collected); withdrawal entry from warehouse for consumption at the place of importation; withdrawal entry from warehouse for transportation to another port of entry; withdrawal entry from warehouse for transportation to a foreign country; and export entry of goods manufactured in the U.S. for the benefit of a drawback.

NOTE 1. — In Boston, the common form is the Inward Foreign Entry. Goods to be transported before payment of duty are sealed and the owner placed under bond.

NOTE 2. — Tobaccos, liquors, etc., produced in the U.S. are subject to an internal revenue tax, paid by the producers. When such goods are to be exported the government pays back the tax thus imposed. The sum paid back is called a *drawback*. To get this the last form of entry given above is made.

NOTE 3. — To secure the delivery of imported goods a long process is necessary. The main facts are as follows: The commander of the vessel presents his report and manifest of cargo and takes the oath. A "manifest number" is given, and the importer presents his invoice and takes the oath. The Entry Clerk then indicates the deductions to be made, the rate of duty to be charged, and the packages which are to be sent to the Appraiser's Stores for examination. The papers afterward go to the Impost Clerk, who reduces the foreign values to U.S. money and computes the duty. All the papers are then sent to the Bond Clerk, where bond is given, if necessary. The Permit Clerk gives permit to land the goods. After this the Naval Officer again computes the duties, examines and countersigns the papers, and sends them to the Cashier, to whom the duty is paid or secured. A Deputy Collector then signs the permit and delivers it to the Inspector in charge of the vessel, after which the goods are delivered, subject at any time during the delivery to additional examination. The goods are confiscated by the government if heavy additional duties are not paid according to the Collector's order when it appears that the importer has attempted to deceive.

148. A BONDED WAREHOUSE is a place in which goods under bond for the payment of duties may be stored at the owner's risk.

NOTE. — Storage is charged so long as the goods remain in the ware-

house. 10% additional is charged after 1 yr., and at the end of 3 yrs. the goods are sold by the Collector, who turns the proceeds into the Treasury.

149. Duties are of two kinds, AD VALOREM and SPECIFIC.

150. An AD VALOREM DUTY is assessed at a certain rate % of the net cost of the goods.

NOTE. — By "net cost" is meant the cost as they were purchased, less discounts, and before charges have been added. If the "net cost" contains a fraction of a dollar less than 50c., the cents are discarded before computing the duty; if 50c. or more, another dollar is added.

151. A SPECIFIC DUTY is assessed at a certain sum per unit of quantity, as camphor, 5c. per lb.; linseed-oil, 25c. per gallon, etc.

NOTE 1. — The Custom-House ton contains 2240 lbs.

NOTE 2. — Any fractional part of the unit on which specific duties are assessed is discarded if the fraction is less than $\frac{1}{2}$, and is called another unit if $\frac{1}{2}$ or more.

NOTE 3. — Some imported articles are subject to both an ad valorem and a specific duty, as woollen goods, 45c. per lb. and 30%.

152. ALLOWANCES are deductions made in estimating specific duties only, and are known as TARE, BREAKAGE, and LEAKAGE.

(T. D. 28041.)

Values of foreign coins.

[Circular No. 22.]

TREASURY DEPARTMENT, April 1, 1907.

In pursuance of the provisions of Section 25 of the act of August 28, 1894, I hereby proclaim the following estimate by the Director of the Mint of the values of foreign coins to be the values of such coins in terms of the money of account of the United States, to be followed in estimating the value of all foreign merchandise exported to the United States on and after April 1, 1907, expressed in any of such metallic currencies.

GEORGE B. CORTELYOU, *Secretary.*

ESTIMATE BY DIRECTOR OF THE MINT OF VALUES OF FOREIGN COINS.

COUNTRY.	STANDARD.	MONETARY UNIT.	Value in terms of U. S. Gold Dollar.
Argentine Republic	Double	Peso	$0.96,5
Austria-Hungary	Gold	Crown	.20,3
Belgium	Double	Franc	.19,3
Bolivia	Gold	Peso	.97,33
Brazil	Single gold	Milreis of 1,000 reis	.54,6
British Possessions in N.A.	Single gold	Dollar	1.00
Chili	Gold	Peso‡	.36,5
Denmark	Single gold	Crown	.26,8
Ecuador	Gold	Sucre	.48,7
Egypt	Single gold	Pound (100 piastres)	4.94,3
France	Double	Franc	.19,3
German Empire	Single gold	Mark	.23,8
Great Britain	Single gold	Pound sterling	4.86,6½
Greece	Gold	Drachma	.19,3
Hayti	Gold	Gourde	.96,5
India	Gold	Pound sterling *	4.86,65
Italy	Double	Lira	.19,3
Japan	Gold	Yen	.49,8
Liberia	Single gold	Dollar	1.00
Mexico	Gold	Peso †	.49,8
Netherlands	Double	Florin	.40,2
Norway	Single gold	Crown	.26,8
Panama	Gold	Balboa	1.00
Peru	Single silver	Sol	.72,7
Portugal	Single gold	Milreis of 1,000 reis	1.08
Russia	Gold	Rouble	.51,5
Spain	Gold	Peseta	.19,3
Sweden	Single gold	Crown	.26,8
Switzerland	Double	Franc	.19.3
Turkey	Single gold	Piastre	.04,4
Columbia	Gold	Dollar	1.00
Venezuela	Double	Bolivar	.19,3
Holland		Guilder	.40,2

NOTE.—The coins of silver standard countries are valued by their pure silver contents, at the average market price of silver for the three months preceding the date of this circular.

* The sovereign is the standard coin of India, but the rupee ($0.32441/5) is the current coin, valued at 15 to the sovereign.

† Seventy-five centigrams fine gold.

‡ One fifth pound sterling.

153. To compute duties.

SPECIFIC DUTY.

RULE.— *First deduct the tare, if any is allowed, and reckon the specific duty on the remainder, regarding any fraction of one-half or more as one more unit, or discarding any fraction less than one-half the unit on which the duty is computed.*

AD VALOREM.

RULE.— *Figure the value of the whole invoice in the foreign money. Change this amount to U. S. money by using the equivalents given in table on Page 125. Fifty cents or over is regarded as one dollar more, but cents less than fifty are discarded. Multiply this number of even dollars by the per cent of duty given.*

EXAMPLES.

1. Imported goods, invoiced at £590 16s. 8d., are subject to a duty of 15%. What is the amount of duty?

2. What is the duty at 30% on goods invoiced at 9645.33 francs?

3. The duty on goods invoiced at 4862.82 marks is estimated at 25%. What is the amount of the duty?

4. An importation of 2450 yds. of dress goods is subject to a duty of $18\frac{3}{4}$c. per yd. What is the amount of duty?

5. I imported 12925 lbs. of salt at $\frac{3}{4}$c. per lb., and paid duty at $7\frac{1}{2}$c. per 100 lbs. What duty did I pay, allowing for tare at 5%?

6. The allowance for tare on an invoice of 1340 yds. of hemp carpeting was 3%. What was the amount of duty at $5\frac{1}{2}$c. per yd.?

7. What is the duty at 20c. per sq. yd. and 35% on an importation of 1800 yds. cloth invoiced at 4 francs per yd.?

8. An importation of iron wire #20, amounting to 12 T. 14 cwt. 3 qr. 21 lbs., invoiced at 3d. per lb., was subject to a duty of 3c. per lb. and 15%. What was the duty?

9. If beer is subject to a specific duty of 20c. per gallon, and an importer's sales are at $16\frac{2}{3}$% profit, what must be his selling price per gallon of 640 gallons invoiced at 5 marks per gallon, if the charges other than duty amount to 32 marks

in Germany and $40 in the United States, the course of exchange on Germany being 94c. to 4 marks?

10. What is the duty at 45c. per sq. yd. and 30% ad valorem on 1560 yds. Axminster carpets, 27 in. wide, invoiced at 8s. 3d. per yd., the shipping charges being £3 7s. 10d. and consul's fee 14s. 10d.? What was the cost of importation?

11. What is the duty at 25% ad valorem on 3 bales of burlaps, each bale containing 40 webs, each web being 48 yds. 20 in. long and 30 in. wide, and invoiced at 30c. per sq. yd.?

12. What is the duty at $1 per cu. ft. and 25% on a block of Italian marble whose dimensions are 5 × 8 × 15 ft., and which was imported at 82 lire per cu. ft.?

13. A Boston merchant imported a lot of knives from Sheffield invoiced as follows: 75 doz. at 12/6; 50 doz. at 18/6; 25 doz. at £1–5/6; 30 doz. at £1–12/6; 15 doz. at £3–11/6; and 10 doz. at £2–10/6. The charges in Sheffield amounted to £5–12/6; the consul's fee was 12/6; marine insurance was 20 cts. per $100 on value of invoice; carting, $2.50; duty at 30% ad valorem and 30 cts. per doz. What was the total cost of the importation?

14. Jones, McDuffee & Stratton Co., of Boston, imported per steamer Ivernia from Liverpool an invoice of 10 crates of English decorated earthenware. Find the total cost of the importation. Discount on goods 2% for cash; crates charged at 18/6 net each; shipping charges at 8/ per crate; consul fee 10/4; freight 690 cubic feet at 6/ per ton of 40 cubic feet; wharfage at 15 cts. per crate; rate of exchange 4.88; marine insurance, 20 cts. per $100 on value of invoice and shipping charges; duty at 60% on value of goods and crates at the Custom House rate of $4.8665 per pound; carting, storage, etc., at $1.50 per crate. The invoice with the weights of the crates are given on page 128.

TUNSTALL, OCTOBER 4TH, 1906.
STAFFS, ENGLAND.

MESSRS. JONES, McDUFFEE & STRATTON CO., BOSTON.

BOUGHT OF **BOOTHS, LIMITED,**

SILICON CHINA, ROYAL SEMI PORCELAIN AND ART TILE MANUFACTURERS.
EARTHENWARE SUITABLE FOR HOME, FOREIGN AND COLONIAL MARKETS.

NO ALLOWANCE FOR BREAKAGE.

Mark J., McD. & S. [B] 29/38 *Through Messrs. David Ingles & Co.*

				Stamped at back "Marquis"				
	216	Plates, $4.^{48}/$, $5.^{36}/_{3}$, $6.^{36}/_{6}$, $7.^{48}/$, $8.^{36}/$, $10.^{12}/_{6}$.	7579	"	£4	6/9	..	..
	24	Soups 7		" "		5/	..	..
	12	Coupe Soups		" "		5/	..	..
	36	Fruits 4		" "		2/6	..	..
	24	Oat Meals		" "		4/6	..	..
	36	Ind. Butters		" "		2/3	..	..
	4	Bakers 8		" "		1/6	..	..
	12	Dishes $8.^{9}/_{1}$, $10.^{3}/_{6}$, $12.^{3}/_{3}$, $14.^{3}/_{3}$, $16.^{1}/$		" "	£1	7/2	..	..
	6	Cover Dishes		" "		5/6	..	..
	1	Soup M and Cover		" "		11/6	..	..
	1	Sauce and Tea		" "		5/2	..	..
29	3	Boats		" "		1/8	..	..
	3	Pickles		" "		1/8	..	..
	3	Cov. Butters and Drainers		" "		2/1½	..	..
	3	Cov. Sugars		" "		2/6	..	..
	3	Creams		" "		8	..	..
	3	Bowls, 30s		" "		8	..	..
	2	B. and B. Plates		" "		8	..	..
	72	Pairs Teas and Scrs.		" "		5/3	..	..
	24	Pairs Brkfts. and Scrs.		" "		8/6	..	..
	12	Pairs A. D. and Scrs.		" "		5/3	..	..
	12	Ramakins and Scrs.		" "		5/3	..	..
	12	Bouillons and Scrs. (Tea size)		" "		7/10½	..	..
30	1	Hogshead, same as No. 29					..	..
31	1	" " "					..	..
32	1	" " "					..	..
33	1	" " "					..	..
34	1	" " "					..	..
35	1	" " "					..	..
36	1	" " "					..	..
37	1	" " "					..	..
38	1	" " "					..	..

	Weights.				Weights.		
	C.	Q.	LBS.		C.	Q.	LBS.
29	4	..	14	34	4	..	20
30	4	..	14	35	4	..	21
31	4	..		36	4	1	
32	4	..	20	37	4	..	21
33	4	..	20	38	4	..	21

Certified correct,

ppro. BOOTHS, LTD.,
ANDREW MERWIN.

INSURANCE.

154. INSURANCE is a contract by which one person or party agrees, in consideration of a certain sum, to pay to another person or party a specified sum in case of a specified loss or damage to the latter's property within a given time.

NOTE. — The contract may secure the payment of money in case of loss to property. This would be called PROPERTY INSURANCE. Or, the contract may secure the payment to some person named, of a certain sum, in case of the death of the person insured. This would be called LIFE INSURANCE.

155. An INSURANCE COMPANY is an association of persons for the purpose of taking risks on the loss of life or property. The company is called the INSURERS or UNDERWRITERS.

NOTE. — Property Insurance Companies, as generally organized, limit their business to one or several of the following classes of risks: Loss or damage by fire (Fire Insurance), by a storm or other danger at sea (Marine Insurance), by transportation from place to place (Transit Insurance), and by breakage, etc., as of plate glass, etc. (Accident Insurance). Life Insurance Companies pay a specified sum at the death of the insured (Life Insurance), or a weekly sum in case of sickness (Health Insurance), or a certain amount in case of accident (Accident Insurance). Some companies do both a Property and a Life Insurance business.

156. Insurance companies are known, according to the way in which they are organized, as STOCK, MUTUAL, or MIXED. The larger number of insurance organizations are Stock Companies.

157. A STOCK INSURANCE COMPANY is one whose capital is owned by stockholders, who share the profits and are liable for the losses.

158. A MUTUAL INSURANCE COMPANY is one in which there are no stockholders, and in which the policy-holders (parties insured) share the profits and bear the losses.

159. A MIXED INSURANCE COMPANY is one in which the principles of the Stock and Mutual are combined. Usually the stockholders receive a specified dividend, and the balance of profit, if any, is shared by the policy-holders.

160. The POLICY is the written agreement between the insurers and the insured, and contains a description of the property, names the day and hour at which the risk begins and ceases, etc.

161. The PREMIUM is the sum paid for the insurance. It is computed at a certain per cent. on the insured value.

NOTE 1. — Sometimes the rate % of premium is expressed as so much per $100 of insurance. Thus, 50c. per $100, or simply 50c., which is understood to mean the same.

NOTE 2. — The rate of premium depends on the amount and nature of the risk and the length of time for which the risk is taken.

FIRE INSURANCE.

162. FIRE INSURANCE is insurance against loss by fire. This insurance covers all loss caused by fire, as loss or damage by water or other means employed to extinguish, or prevent, the spreading of the fire.

NOTE. — Fire Insurance companies usually insure for less than the full value of the property. In such a case the owner is as much interested to avoid loss by fire as the underwriters themselves.

163. Owners of property may insure in one company only, or in several. In case of loss, when the insurance is placed with one company, an ordinary policy would give to the owner the amount of the loss, if not greater than the insurance. When the risk is placed with several companies, and the policies are all ordinary, each company pays that part of the loss which its risk is of the whole risk if such sum is not greater than its risk.

NOTE. — Most policies reserve the right to replace the loss or damage, instead of paying the insurance money.

164. Many policies contain what is known as an AVERAGE CLAUSE, which is to the effect that the liability of the company in case of partial loss shall be *that part of the loss which the insured value is of the full value of the property.*

Thus, a building is worth $12000, and is insured for $8000. The insurance is $\frac{2}{3}$ of the value. If the loss is $9000 the liability of the company is for $\frac{2}{3}$ of $9000, or $6000.

NOTE 1. — Fire insurance policies often contain a co-insurance clause to the effect that if the insured fails to keep his property insured for a certain per cent. of its value, the company will pay him only that proportion of the loss which the per cent. insured bears to the per cent. named in the policy. If the value of a piece of property is $20000, and the insured agrees to keep it insured for 80% of its value, or $16000, but fails to do so and carries only $12000 insurance, should a loss occur the company will pay only $\frac{3}{4}$ ($\frac{12000}{16000}$) of the amount of the loss.

NOTE 2. — A FLOATING POLICY is one which covers goods stored in different places, and is generally taken out to cover goods which may be changed from place to place in the process of manufacture. Floating policies usually contain the average clause.

165. SHORT RATES are rates for time less than a year.

Thus, a company may take a risk of $5000 for one yr. at $\frac{3}{4}$%, or for 6 mos. at $\frac{1}{2}$% (short rate). If the insurance is placed for 1 yr. the premium paid would be $37.50. If, at the end of 6 mos., the policy-holder cancel the policy, the company would retain enough of the $37.50 to equal $\frac{1}{2}$% of $5000, and pay back to the policy-holder the balance, which is the difference between $\frac{3}{4}$% of $5000, and $\frac{1}{2}$% of $5000, or $12.50. If the policy were cancelled by the underwriters, the return premium would be such a part of the total premium as the unexpired time is of the full time.

MARINE INSURANCE.

166. MARINE INSURANCE is insurance against loss or damage to a certain vessel, or her cargo, or both, by storm or other danger of the sea, for a certain voyage or specified time.

NOTE 1. — Marine policies contain the average clause.

NOTE 2. — Consignments are usually insured at short rates.

167. SALVAGE is an allowance made to those rendering voluntary aid in saving vessels or other property from loss by fire or water.

168. An OPEN POLICY is one on which new entries may be made from time to time, as in the case of a vessel taking additional cargo.

NOTE. — Such a policy is of value to importers and those who know that goods are sent them and do not know to what amount. As soon as the owner ascertains the amount he notifies the company, when the entry of the value of the goods is made on the policy or pass-book accompanying. Until such time the policy is supposed to cover the value of the goods and 10% additional.

ORDINARY POLICY.

RULE.— *In cases of partial loss, the insurers will pay the whole amount of damage, except when this damage exceeds the insurance. In that case or in case of total loss the insurers will only pay the full amount of the insurance. Companies dividing the insurance pay such part as their risks are of the total insurance.*

AVERAGE CLAUSE.

RULE.— *In case of partial loss determine what fractional part of the value of the property is covered by the insurance. The insurers will pay only this same fractional part of the damage. If several companies divide the insurance, each will pay the same part of the loss as its insurance is of the total valuation. This rule applies to all marine insurance.*

PRACTICE.

169. *1.* A store is insured for 2 yrs. for \$6000 at $\frac{1}{8}\%$ premium. What is the cost of insurance, \$1.25 being allowed for the policy?

2. What is the premium paid for insuring a factory worth \$8000, and its contents worth \$3000, at $\$1.12\frac{1}{2}$?

3. A warehouse worth \$45000 and its contents worth \$20000 were insured as follows: Building for $\frac{2}{3}$ of its value at $\frac{5}{8}\%$ premium, and the contents for $\frac{3}{4}$ of its value at 75c. What was the premium paid for insuring both?

4. A house worth \$3000 is insured for $\frac{3}{4}$ of its value under an ordinary policy, for which the company received \$1. The rate of premium is \$1.25. If the house is damaged to the extent of \$1200, what is the net loss to the company? What will be the loss if the house is destroyed?

5. A store and contents valued at $24000 are insured as follows: $9000 in the Hartford Insurance Co. at ¾%; $5000 in the Ætna at 75c.; and $6000 in the Eagle at ⅝%. The whole is damaged to the extent of $10000. How much of the loss shall each company pay? What is the net loss to each Co.?

6. A factory worth $7000 and its contents are insured for $18000, as follows: $4500 on the building; $8000 on machinery worth $10000; and $5500 on stock worth $8000. The building is damaged to the extent of $3000, the machinery to the extent of $4500, and the stock is a total loss. How much is the claim against the company if the risk is covered by an "ordinary" policy? How much if the policy contains the "average clause"?

7. A building is insured in three companies for $15000, and is damaged by fire to the extent of $8000. What % of its risk should be paid by each company?

8. The contents of a store are insured for $3600 in several companies, and are damaged by water and otherwise, while extinguishing a fire, to the extent of $300. What % of its risk should be paid by each company? What is the loss of a company whose risk is $1500?

9. A dwelling-house is insured for $4500, as follows: $1500 in the Monarch Ins. Co.; $2000 in the Mass. Mutual; and $1000 in the Birmingham. A partial loss of $2400 is sustained by fire. How much ought each company to pay?

10. A cargo of goods worth $40000 is insured for $9000 in one insurance company, $8000 in another, $7000 in a third, and $8000 in a fourth. What insurance would the owners receive from each company if the cargo were damaged to the extent of $3200? What, if totally destroyed?

11. A vessel worth $50000 and her cargo worth $12000 are insured as follows: On the vessel $42000 and on the cargo $11200. The vessel encounters a storm, and is damaged to the extent of $9000, and $4000 worth of the cargo is lost. How much would be the liability of a company bearing the whole risk? How much is the liability of a company bearing a part risk of $20000 on the vessel and $6000 on the cargo?

12. A ship worth $120000 was insured for $48000 in one company at $\frac{7}{8}\%$ premium, $30000 in another at $\frac{3}{4}\%$ premium, and in a third for $22000 at $\frac{5}{8}\%$ premium. She was damaged to the extent of $30000 by a violent storm. How much may the owners claim from each company?

13. A stock of goods was insured for one year for $8000 at $\frac{5}{8}\%$ premium. At the end of 6 mos. the policy was cancelled at the request of the insured. What was the return premium, the short rate for 6 mos. being $\frac{1}{2}\%$? If this policy had been cancelled at the request of the underwriters at the end of 6 mos., what would have been the return premium? If at the end of 9 mos., what would it have been?

14. My house was insured Sept. 1 for a year for $3000 at 65c. Mar. 1 I cancelled the policy. How much ought the company to return, their short rate for 6 mos. being 40c.? How much would they have returned if they had cancelled at that time instead of me?

15. A company took a risk of $12000 for 2 yrs. at $1\frac{1}{4}\%$ premium, and reinsured $\frac{1}{2}$ of the risk in another company at 90c. What was the company's gain by reinsurance?

16. The British Mercantile Ins. Co. took a risk of $90000 at $1.75, and, finding the risk larger than they wished to carry, reinsured $\frac{1}{3}$ in the Globe Ins. Co. at $1.375, and $\frac{1}{2}$ of the remainder in the Commercial Mutual at $1.40. What was the total gain by reinsurance?

17. A cargo of goods is valued at $3500. For what sum must the owner take out a policy to cover the value and the expenses of insurance, viz., $1.25 for the policy and $\frac{3}{8}\%$ premium?

NOTE. — Add the *known* expenses to the value, and divide the sum by 100% — the rate of premium.

18. I wish to insure a consignment valued at $6500 for such a sum that the face of the policy will cover the value of my goods: $1 for the policy, $3.50 for the survey, and 90c. per $100 premium. For what sum shall the policy be drawn?

EXCHANGE.

170. EXCHANGE is a system of paying debts due in distant places by means of written orders, called Drafts, or Bills of Exchange.

171. A DRAFT, or BILL OF EXCHANGE, is an order written by one person (the DRAWER) requesting a second person (the DRAWEE) to pay to a third person (the PAYEE), or to the payee's order, a certain sum of money and charge the same to the account of the drawer.

172. BILLS OF EXCHANGE are classed as Domestic (or Inland) and Foreign.

173. DOMESTIC OR INLAND BILLS OF EXCHANGE are those drawn and payable at some place in the same state in which they are drawn.

NOTE. — Domestic Bills are usually called *Drafts*, and include *sight drafts* and *time drafts*.

174. FOREIGN BILLS OF EXCHANGE are those payable at some place in another state or country than that in which they are drawn.

175. An ACCEPTANCE is the agreement of the drawee to pay the sum named in the draft.

176. Bills of exchange are subject to the same conditions as to transfer, indorsement, and protest as are promissory notes.

177. The FACE or PAR of a bill of exchange is the sum named in the bill.

NOTE 1. — When bills sell for more than their face, exchange is said to be at a *premium*; when they sell for less than their face, exchange is said to be at a *discount*.

NOTE 2. — When Boston owes New York the same sum that New York owes Boston, exchange will be at par; but when Boston owes New York more than New York owes Boston, exchange on New York will be at a premium, since there will be more buyers of New York exchange than sellers; and when New York owes Boston more than Boston owes New York, exchange on New York will sell at a discount and exchange on Boston at a premium.

DOMESTIC EXCHANGE.

178. DOMESTIC EXCHANGE is that payable in the same country in which it is drawn.

NOTE 1. — *Sight drafts* are subject to the discount or premium only of exchange; while *time drafts* are subject to the exchange discount or premium and to bank discount also. Exchange discounts and bank discounts on bills are *always in favor of the purchaser;* exchange premium is *always in favor of the seller.* These things are *always* computed on the face.

NOTE 2. — The rate of premium or discount is given in some places at a certain %, as, $\frac{1}{2}\%$, $\frac{1}{8}\%$, etc.; but in other places the same things are given at so much per $1000 as $1.25, $2.50, etc., meaning $1.25, or $2.50, per $1,000.

NOTE 3. — The rates of domestic exchange are limited by the cost of shipping the money. Thus, a debtor will not pay greater premium than what would be the cost of shipping the money.

NOTE 4. — In purchasing time drafts due in distant places, bankers sometimes charge interest for the time required for the return of the money after the draft is paid; and when the draft is payable at a certain time after sight, allowance is also made for acceptance. That is, the unexpired time is increased by the addition of either or both of these times, and the draft is discounted for the total time thus found.

179. To find the cost or selling price of a sight draft.

RULE. — *Compute the premium or discount on the face, and to the face add the premium, or from the face subtract the discount.*

EXAMPLES.

Find the value of following drafts:

1. $1200 bought at $\frac{1}{2}\%$ premium.
2. $2500 bought at $\frac{1}{4}\%$ discount.
3. $750 sold at $\frac{3}{4}\%$ discount.

4. $3000 bought at $\frac{1}{8}\%$ premium.
5. $1800 sold at $\frac{1}{8}\%$ discount.
6. $4500 sold at $1.50 discount.
7. $1600 bought at $1.25 discount.
8. $5400 bought at $2.50 premium.
9. $1450 sold at 50c. premium.
10. $9000 sold at 25c. premium.

180. To find the cost or selling price of a time draft.

RULE.— *Figure discount or premium, and interest on the face of the draft given. To the face add the premium or subtract the discount. From the result subtract the interest. Include all days allowed for acceptance, when reckoning the interest. Rates given in dollars and cents are per $1000.*

EXAMPLES.

Find the value of the following time drafts:

1. $2700 drawn at 30 days, interest 6%, exchange $\frac{1}{8}\%$ discount.
2. $1500 drawn at 15 days, interest 7%, exchange $\frac{1}{4}\%$ discount.
3. $1260 drawn at 45 days, interest 5%, exchange $\frac{1}{2}\%$ discount.
4. $975 drawn at 10 days, interest 8%, exchange $\frac{3}{8}\%$ premium.
5. $2150 drawn at 60 days, interest 6%, exchange $\frac{1}{4}\%$ premium.
6. $4200 drawn at 20 days, interest 4%, exchange $\frac{5}{8}\%$ premium.
7. Find the cost of a draft drawn in Boston on St. Louis for $8400, and payable 60 days after sight, exchange being at 25c. discount, interest 6%, and 3 days being allowed for acceptance.
8. A banker in Boston discounts a draft for $10000, payable in San Francisco 30 days after sight. What would be the proceeds, exchange being at $2.50 premium and interest 6%, if 7 days are allowed for acceptance?

9. A commission merchant in New Orleans purchased for me a consignment of molasses costing $8500. His commission for buying was 3%. If exchange is at 20c. premium and interest 6%, what shall I pay for a 30-day draft in settlement?

181. To find how large a draft can be purchased with a given sum.

RULE.—*Using $1.00 as the face, add the premium or subtract the discount, and from this result subtract the interest on $1.00. Divide the given proceeds by the proceeds of $1.00 thus found.*

EXAMPLES.

Find the face of the following bills bought for —

1. $4788 exchange at ½% discount.
2. $3759.375 exchange at ¼% premium.
3. $6583.50 exchange at $2.50 discount.
4. $3241.62 exchange at 50c. premium.
5. $1794.60 at 30 days, exchange at ¼% premium, interest 6%.
6. $2457.68 at 15 days, exchange at ½% discount, interest 8%.
7. $2681.775 at 60 days, exchange at ⅜% premium, interest 6%.
8. An agent sold 40 casks of wine, each containing 36 gallons, at $1.50 per gallon, and, after deducting his commission of 3%, remitted the proceeds by a sight draft purchased at ⅛% premium. What was the face of the draft?
9. A commission merchant sold a consignment of whale oil at 4% commission, for $12600. His charges other than commission amounted to $250. How large a 10-day draft can he buy with the proceeds to remit to the consignor, if exchange is at ⅜% discount and interest 6%?
10. An agent sold 250 cases of shoes, each case containing 2 doz. prs., at $3.25 per pr., and deducted 1½% commission

for selling and $25.50 for other expenses. With the proceeds he purchased a 30-day draft to remit to his principal at $\frac{1}{8}\%$ premium and 8% interest. What was the face of the draft?

11. An agent sold leather at 22½c. per lb., and charged 4 % commission and $4.80 for advertising. The proceeds were $3300. With this sum he purchased through a broker a 45-day draft to remit to his principal at $\frac{1}{8}\%$ premium and 6% interest, broker's fee, $\frac{1}{8}\%$. What was the face of the draft? How many lbs. were sold?

12. If in each of the following columns the terms marked √ are given, how may the term marked ? be found?

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Face of draft.....	√	√	√	√	√	√	√	√	..	..	?	?	?	?
Rate of premium....	√	..	√	..	√	√	..	..	..	..	√	..	√	..
" " discount	..	√	..	√	..	..	√	√	..	..	..	√	..	√
" " interest.....	..	..	√	√	√	√	√	√	..	..	..	..	..	..
" " brokerage...	..	..	..	..	√	√	√	√	√	√	..	..	√	√
Days to maturity.....	..	..	√	√	√	√	√	√	..	..	..	..	..	..
Market value.....	?	?	?	?	..	..	..	..	?	√	√	√	..	..
Gross cost (purchase)	..	..	..	..	?	..	?	..	√	..	..	..	√	..
Net proceeds (sale)..	..	..	..	..	..	?	..	?	..	?	..	..	..	√

NOTE. — The preceding problems in Domestic Exchange may also be worked out by the following rules:

182. To find the cost or selling price of a one-dollar sight draft.

RULE. — *To the face of the draft — one dollar — add the premium, or from the face subtract the discount.*

183. To find the cost or selling price of a one-dollar time draft.

RULE. — *Find the cost of a one-dollar sight draft, as by Rule, and from this subtract the interest of $1 for the given time at the given rate.*

184. To find the cost or selling price of a draft for any amount.

RULE. — *Find the cost of a one-dollar draft by the above rules, then multiply by the number representing the face of the draft given.*

FOREIGN EXCHANGE.

185. FOREIGN EXCHANGE is exchange drawn in one country and payable in another.

186. Foreign bills are usually drawn in sets of two or three of the same tenor and date. The several bills are then sent by different routes or at different times by the same route, and they are so worded that the first one to arrive shall be honored and the others become void. This process secures safety in sending foreign bills.

NOTE 1. — Foreign bills are usually drawn in the money of account of the country in which they are payable.

NOTE 2. Foreign bills are usually drawn payable at sight, or at 60 days after sight. Three days of grace are allowed on both classes. Sight drafts are called "short exchange" and 60-day drafts "long exchange." *No bank discount is computed on 60-day drafts*, since the quotation at which "long exchange" is sold is enough less than that at which "short exchange" is sold to equal the interest on the bill for the difference in time between the two dates of maturity.

187. The INTRINSIC PAR OF EXCHANGE is the *actual* value of the money of one country expressed in the money of another. It is found by comparing the pure gold contained in a unit of the money of one country with that contained in a unit of the money of another.

NOTE. — The *intrinsic* value of foreign moneys is established by comparison with our gold dollar. The intrinsic values of foreign moneys of account are given in the table. Page 125.

188. The COMMERCIAL RATE OF EXCHANGE is the *market* value of the money of one country expressed in the money of another. This value changes in accordance with the different conditions of commerce, and may be regarded as covering what is known in Domestic Exchange as *premium* and *discount*.

NOTE 1. — The commercial Rate of Exchange is used in adjusting accounts between private citizens of the United States and citizens of foreign countries. The Intrinsic Par is used in estimating values on which to compute customs, and in all dealings between our government and that of foreign countries.

NOTE 2. — The greater part of our exchange is conducted with Great Britain, France, Belgium, Switzerland, Holland, and Germany, or with countries that use the same monetary units as they do. It is enough for ordinary business use to be familiar with the quotations of their moneys, which are given as follows: Exchange on Great Britain is quoted by giving the value of £1 in dollars; on France, Belgium, and Switzerland, by giving the value of $1 in francs; on Holland, by giving the value of 1 guilder in cents; and on Germany, by giving the value of *four* marks (reichsmarks) in cents.

NOTE 3. — Gold is *exported* at a profit when the cost of foreign exchange is enough greater than the intrinsic value of the bill to pay the cost of safe shipment and yet leave a margin; and gold is *imported* at a profit when the cost of exchange is enough less than the intrinsic value of the bill to pay the same expenses and leave a margin. Thus the commercial rate is not allowed to vary from the intrinsic par by more than enough to pay the expense of shipping gold.

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189. A LETTER OF CREDIT is a document issued by a banking house instructing its correspondents in different countries, which the traveler is about to visit, to pay the holder funds in any amount not exceeding a specified sum.

Letters of credit are usually drawn in pounds sterling, but if desired are paid in the current money of the country in which they are negotiated. A commission of 1% is usually charged by the bank issuing the letter of credit.

Instructions as to how and where a person may obtain funds in foreign countries are furnished with or may be a part of the letter. The amounts drawn are usually endorsed on the back of the letter.

NOTE. — The difference between a *bill of exchange* and a *letter of credit* is that the former is payable at one place, at one fixed time, and in one sum; while the latter is payable at several places, at different times, and in sums at the option of the payee.

LETTER OF CREDIT (BANK.)

No. 1357.

for £1500. *Boston, Mass., U.S.A., June 15, 190 4.*

To our

Correspondents.

Gentlemen,

We beg leave to introduce to you Mr. John M. Duhig, in whose favor we have opened a Credit for £1500.

Fifteen hundred pounds Sterling.

We have to request that you will furnish him with whatever funds he may require to the available extent of this Credit against his Drafts at sight on (London Bank)

The Drafts should state on their face that they are drawn under this Credit and your charges should be deducted from the proceeds.

All Drafts so negotiated should be endorsed on this Credit which will continue in force until Sept. 1st, 1905.

Requesting for Mr. John M. Duhig your best attention, we have the honor to be,

Gentlemen,

Your obedient servants,

This letter must be returned with the last draft.

Signature of the holder
John M. Duhig.

(BANK.)

Cashier.

190. To find the cost or proceeds of a foreign draft.

RULE.— *If the quotation is the value of an English pound, multiply such quotation by the number of pounds given, reducing shillings and pence to a decimal part of a pound. If the amount is given in francs, change this amount by dividing by the quotation given as the value of one dollar expressed in francs. If the money is in guilders, multiply by the quotation given. If the money is in marks, multiply*

by the quotation, and divide the result by 4. When brokerage is mentioned, compute it on the amount expressed in dollars and cents and add it to the amount, if cost is required, or subtract it, if proceeds is asked for.

EXAMPLES.

Find the cost or selling price of the following bills:

1. £450 at 4.83½.
2. £765 at 4.85¾.
3. £310 5s. 8d. at 4.84¼.
4. £982 15s. 11d. at 4.85⅛.
5. 13506.42 francs at 5.18½.
6. 9462.90 francs at 5.19.
7. 8540.75 francs at 5.20¼.
8. 2467.33 francs at 5.19⅜.
9. 897.7 guilders at 39⅞.
10. 1265 guilders at 40¼.
11. 6275.18 guilders at 40½.
12. 742 guilders at 40⅝.
13. 1860 marks at 94¼.
14. 2720 marks at 95½.
15. 5150 marks at 94⅞.
16. 1187.9 marks at 95⅝.

17. Find the cost of a draft on Hamburg at 60 days' sight for 1247.6 reichsmarks, exchange quoted at 96⅛.

18. Sold through a broker a draft on Paris drawn at 60 days' sight for 18700 francs, exchange selling at 5.19½, broker's fee, ¼%. What did I receive?

19. My agent in Amsterdam purchased for me merchandise amounting to 3840 guilders. His commission was 5%. What was the cost of the draft in payment, exchange being at 40¾?

20. An agent in Dresden sold for me 400 boxes of cigars at 28 marks per box, and 297 kegs of tobacco, containing 55 lbs. each, at .92 marks per lb. His commission was 4½%. I drew on him for the proceeds and sold the draft through a broker at 95⅛. What did I receive if the broker charged ⅛% for his services?

191. To find the face of a foreign draft.

RULE.— *If brokerage is mentioned, first divide the amount given by 100 per cent minus the rate of brokerage, if the draft is sold; or by 100 per cent plus the rate, if it is bought. Then reduce the result to English money by dividing it by the quotation given, carrying it four places of decimals. This fraction of a pound must be changed to shillings by multiplying it by 20. Any fraction of a shilling must be changed to pence by multiplying by 12. An amount can be*

changed to francs by multiplying it by the quotation given; to guilders by dividing by the quotation; to marks by dividing by the quotation and multiplying the quotient by 4.

EXAMPLES.

Find the face of a bill of exchange that cost —

1. \$7295.40 at 4.85½.
2. \$1423.81 at 4.83¾.
3. \$3600.90 at 5.18¾.
4. \$4125.75 at 5.19⅝.
5. \$720.39 at 40¼.
6. \$1654.67 at 41⅛.
7. \$2326.52 at 94¼.
8. \$1294.66 at 93⅞.

9. \$1728.25, if bought through a broker at 4.83½, brokerage ⅛%.

10. \$5630.18, if bought through a broker at 5.20¼, brokerage ¼%.

11. \$6311.40, if bought through a broker at 40⅝, brokerage ⅛%.

12. \$965.37, if bought through a broker at 93½, brokerage 1/16%.

13. I bought through a broker a bill of exchange on Manchester and paid \$4923.78. Exchange was selling at 4.83¾, and the broker charged ¼%. What was the face of the bill?

14. A broker sold for me a bill on Bristol at 4.85 and charged ⅛% brokerage. What was the face of the bill if the net proceeds were \$3940.82?

15. I bought of an exchange banker a 60-day bill on Bordeaux and paid \$2716.87. What was the face of the bill, exchange being at 5.19¼?

16. What is the face of a bill on Amsterdam, bought for \$5721.10, exchange at 41⅜ and brokerage ⅛%?

17. A bill of exchange on Munich sold for \$1127.45 when exchange was at 93¾. What was the face, brokerage ⅛%?

18. N.Y.C. R.R. stock is quoted in London at 115½ What is the equivalent N.Y. quotation, the course of exchange being 4.89?

NOTE. — The London price is made at \$5 to the £.

19. St. Paul R.R. stock is quoted in N.Y. at 86. Find the London quotation, if exchange is at 4.86.

20. A draft on Paris for 8572.72 fr. cost \$1650.66, including ⅛% brokerage. Find the quotation of exchange.

21. On the letter of credit, page 142, the following payments are recorded on the back: June 25, 1904, £100; July 18, £200; Aug. 16, £100; Sept. 19, £200; Nov. 20, £200; Jan. 6, 1905, £100; Feb. 14, £100; April 4, £100; June 10, £100; July 20, £100. At $4.85 to the pound, how much did the bank pay on the letter?

22. If, in each of the following columns, the terms marked √ are given, how may the term marked ? be found?

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Face of draft	√	√	√	√	√	√	?	?	?	?	√	√	√	√	?
Quotation of Eng. Exch.	√	..	..	..	√	..	√	..	..	..	?	..	..	?	..
" " French "	..	√	..	..	..	√	..	..	..	..	..	?	..	..	..
" " German "	..	..	√	..	..	..	..	√	√	..	..	..	?	..	..
" " Holland "	..	..	..	√	..	..	..	..	..	√	..	..	..	..	√
Brokerage	..	..	..	..	√	√	..	√	..	√	..	..	..	√	√
Market value	?	?	?	?	..	..	√	..	..	..	√	√	√	..	..
Gross cost (purchase)	..	..	..	..	?	..	..	..	√	..	..	..	..	√	..
Net Proceeds (sale)	..	..	..	..	..	?	..	√	..	√	..	..	..	..	√

STOCKS AND BONDS.

192. A CORPORATION is an association of persons authorized by law to transact business as one person.

NOTE. — The right to do business in this manner is obtained by special act of Legislature, and this act is called the CHARTER.

193. The CAPITAL STOCK is a certain valuation taken by the corporation as a basis of business, and represents the worth of the corporation's property.

NOTE 1. — The Capital Stock is divided into shares usually of $100 each. Shares of $25 and $50 are called quarter stock and half stock, respectively.

NOTE 2. — A STOCK CERTIFICATE is a paper given by the company to the Stockholders, specifying the number and value of the shares which they hold.

194. The PAR VALUE of a share is the value given it by the corporation at the time of the division of the capital stock.

195. The MARKET VALUE of a share is the sum for which it will sell.

NOTE. — At the time of forming the organization, individuals subscribe for stock in such quantities as they wish and at a price dependent on the need of the company and the prospect of the business. Thus, stock may start at its par value, or at a price above or below its par value. When the stock is put upon the market, its desirability as an investment usually regulates the price at which it will sell. When stock sells for more than its par value, it is said to be *above par*, or *at a premium;* and when it sells for less than its par value, it is said to be *below par* or *at a discount.*

196. WATERING STOCK is a term applied when the corporation issues new stock to the stockholders in addition to what they then own without requiring payment for the new shares.

NOTE. — This may occur for various reasons. The ordinary objects are: To dispose of a dividend which, if all paid in cash, would be at a larger rate

than the charter specifies; and in case of consolidation of two or more corporations whose stock is selling at different quotations, in order to give to the holders of stock in the original companies an equivalent value in the stock of the new company. It is thus seen that the *quantity* is increased while the *value remains the same.*

197. A DIVIDEND is that part of the net earnings of a corporation which is divided among the stockholders.

NOTE 1. — Dividends are paid in cash or "scrip," which entitles the holder to cash and interest.

NOTE 2. — The GROSS EARNINGS is the total receipts *before* expenses have been paid. The NET EARNINGS is what is left of the gross earnings *after* payment of expenses.

198. An ASSESSMENT is a tax levied upon stockholders to make up losses, etc.

NOTE. — Dividends and assessments are declared at a certain % of par value.

199. PREFERRED STOCK is that part of the stock which is entitled to a certain rate of dividend before any dividend can be declared on the common stock.

NOTE. — In case of debt greater than the corporation can conveniently pay, the holders of common stock, to save the management from passing out of their hands, generally advance the money and receive in return preferred stock. The preferred stock of a company usually sells at a higher price than the common stock.

200. The BOND of a corporation is its promissory note, payable at a fixed time with a certain rate of interest which is payable at the end of certain periods.

NOTE 1. — Bonds of a business corporation are usually secured by a deed of trust and mortgage of all or part of its property; while bonds issued by our general government or any of its subdivisions are dependent for payment upon the good faith of the people.

NOTE 2. — Bonds are generally issued to secure loans.

201. BONDS are issued in two classes, — REGISTERED and COUPON.

A REGISTERED BOND is payable to the order of the owner, and can be transferred only by acknowledged assignment, and its interest is payable by cash or check from the corporation. A COUPON BOND is one with interest certificates attached. These certificates are taken off from time to time and presented at a designated place for payment. Government coupons will be cashed by any bank in the United States.

NOTE. — Bonds are distinguished, in addition to the above names, by one or several of the following things: The nature of security, as 1st. mortgage, 2d. mortgage, etc.; the name of the corporation that issues them; the date at which they are payable or redeemable, or both; the rate of interest they bear; the purpose for which they are issued, etc. Thus, Toledo and Wabash 2d.; C. R. I. & P. 6's 1907, coupon; U. S. 4's, reg. 1907; U. S. 10–40's of 1864, 5's; continued 6's, 6's of 1881; etc.

202. Stocks and Bonds are quoted at so much per cent. of $100, taken as par value, except in the cases of mining stocks and some others not prominent in the market.

NOTE. — In quoting half stock the per cent. of value of two shares is given; that is, the value of $100 worth of stock is quoted.

203. COMMISSION is allowed brokers on transfers of stock or bonds, usually at $\frac{1}{8}\%$. of par value.

EXAMPLES.

204. *1.* A railroad with a capital of $2550000 declared a dividend of $5\frac{1}{2}\%$. What was the amount of dividend paid? How much did A receive, who held 450 shares?

2. A corporation with a capital of $875400 declared a dividend of $54712.50. What was the rate of dividend?

3. The stockholders of a company having a capital stock of $350000 were assesssd $3\frac{1}{4}\%$. What was the total assessment, and how much did A pay, who held 80 shares of $100 each?

4. A stockholder who has 125 shares is assessed $312.50. What is the rate of assessment and the assessment per share of $100?

5. A manufacturing company declared a dividend of $3600, which was at the rate of $4\frac{1}{2}\%$ on its capital stock. How many shares of $100 each in its capital?

6. What is the cost of 130 shares Bell Telephone stock at $217\frac{1}{4}$, brokerage $\frac{1}{8}\%$?

7. How much must I pay for 75 shares N. Y. & N. E. com. at $50\frac{5}{8}$, brokerage $\frac{1}{8}\%$?

8. Find the cost of $1000 Louisville & Evansville R. 1st 6's at $104\frac{3}{4}$; $4000 Chicago, Kansas & Western 5's at $101\frac{3}{8}$;

40 Atchison, Topeka, and Santa Fé R. at $50\frac{5}{8}$; and 60 shares B. & M. R.R. at $222\frac{1}{2}$, brokerage on all $\frac{1}{8}\%$?

9. What is the cost of 150 shares C. B. & Q. at $144\frac{7}{8}$; 65 Fitchburg R.R. pref. at $104\frac{1}{4}$; and \$5000 Chi., Kansas, & Western inc. at $66\frac{1}{2}$, brokerage on all $\frac{1}{8}\%$?

10. Sold \$3000 Mex. Cen. R. 4's at $71\frac{3}{4}$; \$1500 Ogdensburg & Lake Champlain R. cons. 6's at $104\frac{3}{4}$; 300 shares B. C. & M. at $105\frac{3}{4}$; and 175 Oregon Transcon. Co. at $30\frac{3}{8}$. What were the net proceeds due me, allowing $\frac{1}{8}\%$ brokerage?

11. How much must I place in the hands of a broker to cover the cost of 10 U.S. 5–20 bonds of \$1000 each at $105\frac{1}{8}$ and brokerage $\frac{1}{8}\%$?

12. What is the proceeds of 450 shares half stock sold at $102\frac{3}{4}$, brokerage $\frac{1}{8}\%$?

13. How much must I invest in U.S. 4's of 1907 to secure a quarterly income of \$460, bonds selling at $112\frac{1}{2}$, brokerage $\frac{1}{8}\%$?

14. I purchased through a broker U.S. 4's of 1907 at $118\frac{3}{8}$, and paid \$4740. What was my annual income from this investment?

15. I purchased 140 shares R.R. stock at $2\frac{1}{2}\%$ discount, and sold the same at $1\frac{1}{4}\%$ premium. What was my net gain, allowing the usual brokerage each way?

16. Sold 60 shares Old Colony R.R. and received \$11107.50 as the net proceeds. At what quotation was the stock sold, allowing the usual brokerage?

17. Purchased stock at $4\frac{3}{4}\%$ discount, and sold the same at $2\frac{7}{8}\%$ premium, making a net profit of \$1770. Usual brokerage allowed, how many shares did I buy?

18. Sold 400 shares Boston & Northern R.R. at $18\frac{3}{4}\%$ premium, and paid usual brokerage. What were the net proceeds?

19. Bought manufacturing stock at $175\frac{1}{8}$ for \$21030, and sold the same at $179\frac{1}{4}$. What was my net gain, brokerage $\frac{1}{8}\%$ each way?

20. I own bank stock on which the quarterly dividends at $2\frac{1}{4}\%$ are \$720. I sold 200 shares of this stock at $187\frac{1}{2}$, and

the remainder at 189¼. What were the net proceeds, usual brokerage?

21. Bought 180 shares R.R. stock for $15772.50, including the brokerage. At what quotation did I buy?

22. What annual income will be realized by investing $13485 in stock paying 8% dividends at 112¼, brokerage ⅛%?

23. At what price must 6% stock be bought to realize 5% on the investment, no brokerage?

NOTE. — Divide the income per share ($6) by the rate of income on the investment (5%) and the quotient will be the investment per share ($120). If the quotation is required, subtract the rate of brokerage, if any, from the investment, thus: 120 — ⅛ = 119⅞. Give the nearest ⅛ in your answers.

24. What can I afford to pay for 8% stock to realize 6% on the investment, no brokerage?

25. I buy 7% stock at a price that yields 10% on the investment. What is the quotation, allowing usual brokerage?

26. At what quotation can I buy 9% stock through a broker to net 6% income on the investment?

27. What can I afford to pay for 5% stocks to secure an income of 7% on the investment, no brokerage?

28. What is the quotation of 4% stock bought through a broker so as to realize 6% on the investment?

29. What % will be realized on the investment by buying 5% stock at 60, no brokerage?

30. I buy 9% stock at 112½, what is the rate of income on my investment?

31. What rate do I realize by investing in 7½% stocks at 125, no brokerage?

32. If I buy 6% stock at 74⅞ and pay ⅛% brokerage, what % do I realize on my investment?

33. What rate is realized on an investment in 8% stock at 159⅞, usual brokerage?

34. What % dividend does stock pay which bought at $75 per share yields 6% on the investment?

35. If I buy stock at 112⅜ and pay usual brokerage, what is the rate of dividend on the stock, if the income is 8% of my investment?

36. Stock bought at 79⅞ with usual brokerage yields 4% on the investment. What % of dividend does the stock pay?

37. Which is the better investment, stock paying 6% dividends bought at 75, or stock paying 9% dividends bought at 120?

38. I paid $14625 for 150 shares of stock and realized 4% on my investment. What rate of dividend did the stock pay?

39. Bought 65 shares of stock at 120, and thus realized 5% on my investment. What was the rate of dividend?

40. I hold 125 shares of stock paying one semiannual dividend of 3½% and another of 4%, by which I realize 8% on my investment. What did I pay for the stock?

41. Stock paying 9% dividends is bought at a price that yields 5% on the investment. What is the cost of 90 shares at this rate, and what is the quotation?

42. I bought bank stock at 40% above par and thus realized 5% on my investment. If I buy manufacturing stock paying the same rate of dividend at 10% below par my annual income from this invesment will be $1456. What will be the cost of the manufacturing stock?

43. A gentleman invested $15765, as follows: In 50 shares stock paying 8% dividends at 98¼, $6000, Rutland R.R. 6's at 109⅜, and the remainder in Central Mass. R.R. paying 4% dividends at 38¾. What was his total income, allowing ⅛% brokerage on all?

44. A capitalist invested $25428.75, as follows: $8776.25 in Erie 7's cons. gold bonds at 125¼; $11562.50 in U.S. 4's reg., 1907 at 115½; and the remainder in Pittsburg, Fort Wayne, & Chicago, 2d, 7's, 1912, at 127⅛. What was his annual income, brokerage on all ⅛%?

45. I have $9000 and can invest it in bank stock at 375 paying 3¾% every 3 mos., or in manufacturing stock at 150 paying 4% semiannually. Which stock should I buy and how much greater is my dividend on the better investment?

46. If stock worth 90 be watered 12½%, what is the actual value of the watered stock?

47. A corporation whose capital stock is represented by 3000 shares has on hand undivided profits amounting to $62250. The stockholders wish to announce the dividend at 12½% and retain a reserve balance of $16000. How many shares of watered stock must they issue to bring the rate of dividend down to the required rate? If A owned 300 shares what part of the profit came to him?

48. If, in each of the following columns, the terms marked √ are given, how may the term marked? be found, and why?

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Par value	√	√	√	√	√	?	?	?	?	?	√	√	..	..
Rate of premium	√	..	..	√	..	√	..	..	√	..	?	..	?	..
" " Discount	..	√	..	..	√	..	√	..	..	√	..	?	..	?
" " Quotation	..	..	√	..	..	..	..	√	..	..	..	..	√	√
Premium	?	..	..	..	..	√	..	..	..	..	√	..	√	..
Discount	..	?	..	..	..	..	√	..	..	..	..	√	..	√
Market value	..	..	?	?	?	..	..	√	√	√	..	..	..	..

	15	16	17	18	19	20	21	22	23	24	25	26	27
Par value	..	..	..	..	..	..	?	..	..	√	..	?	..
Rate of brokerage	..	√	..	√	..	√	..	..	√	√	..	√	√
" " Quotation	..	..	√	√	√	√	..	..	√	√	..	√	√
" " income on par	√	√	√	√	?	?	√	..	..	..	..	..	√
" " " on investment	√	√	?	?	√	√	..	√	..	..	?	..	..
Income	..	..	..	..	..	..	√	√	..	..	√	..	√
Investment per share	?	?	..	..	..	..	..	..	?	..	..	..	..
Total investment	..	..	..	..	..	..	..	?	..	?	√	√	?

49. Two railroads consolidate. One has a capital of $1200000, and the other a capital of $2420000. For every share of the first the consolidation gives $1\frac{1}{5}$ shares of new stock and for every share of the second $1\frac{1}{2}$ shares of new stock. The stock of the first was worth 120 in the market before consolidation and the stock of the second 150. What is the capital of the new company? How much was each stock watered? What is the actual value of the watered stock?

THE STOCK EXCHANGE.

205. The STOCK EXCHANGE is an incorporated body of brokers for the purpose of dealing in stocks, bonds, and other securities listed on the books of the exchange.

NOTE 1. — The privilege of doing business on the exchange is called a "seat" on the exchange. The number of seats on the Boston Stock Exchange is limited to 150 and those on the New York Exchange to 1200. Seats on the Boston Exchange sell for about $17000, while in New York the price is about $30000.

NOTE 2. — There are two regular sessions of the Boston Exchange each day, — one in the forenoon and one in the afternoon. These sessions are termed "calls." During the calls, the names of the various stocks and bonds listed on the books of the exchange are called in a certain order, and bids and offers are made by buyers and sellers. Transactions effected during calls, as also all transactions made "between calls," are recorded on the books of the exchange.

206. Some of the ways in which stocks are bought and sold on the exchange, are as follows: "Cash"; "regular"; "buyer 3, 10, 30, 60"; "seller 3, 10, 30, 60." The last two classes of contracts are called "options."

"CASH" means that the stock is deliverable the day it is sold.

"REGULAR" means that if bought, it is to be paid for on the following day; if sold, it is deliverable on the following day.

"BUYER 3, 10," etc., means that the buyer has the choice of the day on which he shall demand the stock from the seller; but he must demand it before the expiration of the time for which the contract is made.

"SELLER 3, 10," etc., means that the seller has the choice of the day on which he shall deliver the stock; but he must deliver it before the expiration of the time for which the contract is made.

NOTE. — One day's notice is required of intention to close an option of more than 3 days. Any of these contracts of 3 days or less carry no interest; but, if the contract is greater than 3 days, interest on the *market price* of the stock for the expired time is paid *from buyer to seller*.

207. In addition to the above ways of buying and selling stock, there are contracts known as "PUTS," "CALLS," "SPREADS," and "STRADDLES," for which the buyer pays a certain sum (usually 1% of par for each privilege given him) and agrees to take or deliver the stock, if to his advantage to do so.

A PUT is a contract by which the holder is entitled to deliver to the seller of the privilege a certain number of shares of a specified stock at a fixed price within a certain time.

NOTE 1. — Puts are bought with the expectation of a decline in the price of stock, and the price specified in the contract is usually less than the market price of the stock at the time the contract is made. If the stock decline below the specified price, the holder can buy at the depreciated price and sell at the specified price, thus netting a profit, if the difference is more than enough to pay expenses.

NOTE 2. — The expenses of the buyer of the Put are usually 1% premium paid the seller, $\frac{1}{16}\%$ paid the broker for securing the contract, and $\frac{1}{8}\%$ paid the broker on the transfer of the stock. If the stock does not decline the holder loses the 1% and $\frac{1}{16}\%$ by refusing to deliver.

A CALL is a contract by which the holder is entitled to call upon the seller of the privilege for a certain number of shares of a specified stock at a fixed price within a certain time.

NOTE 1. — Calls are bought with the expectation of an advance in the price of stock, and the price specified is usually more than the market price of the stock at the time the contract is made. If the stock advances beyond the specified price the holder can buy at the specified price, and sell at the advanced price, thus netting a profit, if the difference is more than enough to pay expenses.

NOTE 2. — The expenses of the buyer of the Call are at the same rates as those of the buyer of a Put. His losses by refusing to call when the stock does not advance are the same as the losses by failing to deliver on a Put.

A SPREAD is a double privilege, giving the holder the privilege of calling for, or delivering the stock as he may wish.

A STRADDLE is the same as a Spread, except that the price named is the current market price instead of at a distance on each side of the market.

NOTE 1. — The premium paid for a Spread or Straddle is usually at least double that of a Put or Call, and the commission paid the broker is $\frac{1}{16}\%$ for each part of the contract, and $\frac{1}{8}\%$ for transfer.

NOTE 2. — These privileges are often used by speculators as protection from heavy loss in their investments.

208. A MARGIN is a deposit of cash or its equivalent made with a broker by a person who wishes to speculate in a certain stock, to secure the broker against loss while "carrying" the stock. It is usually 10% of the market value.

NOTE 1.—In case of a decline in the price of the stock the speculator is required to keep good his 10% margin, or the broker will "sell him out" to protect himself. The difference between the margin deposited and the balance due the speculator when the stock is sold is the latter's net gain or loss.

209. A SHORT SALE is a sale of stock which the seller does not own, but borrows, or for which he contracts, for delivery, expecting to buy in at a lower rate to "cover his short."

NOTE.—Stock is purchased at a margin when it is expected the price will advance; and "short" sales are made when it is expected the price will decline. When a speculator buys a large quantity of stock at a margin or otherwise and holds it for a rise, he is said to be "long" of stock; and when he sells what he does not own (short sale), he is said to be "short" of stock.

210. A BULL is a person who is "long" of stock.

NOTE.—As bulls pay interest on the market value of the stocks which they carry, they endeavor to advance the price of their stock so as to be able to sell or "unload" at a profit.

211. A BEAR is a person who is "short" of stock.

NOTE.—Bears pay no interest, but endeavor to depreciate the price of the stock they have sold, so as to buy it in at the depreciated price to "cover" their short sales and realize a profit.

212. Dividends declared during the pendency of any of the contracts above described belong with interest to the purchaser, unless it is otherwise agreed.

RULE FOR MARGINAL ACCOUNTS.

Dr.	*Cr.*
Cost of stock.	Margin (10% of cost).
⅛% brokerage for buying.	Dividends (on par).
Int. on cost and brokerage.	Sale of stock.
⅛% brokerage for selling.	Int. on margin.
	Int. on dividends.

Date every item. Balance the account. Balance of acct. minus margin equals gain.

PRACTICE.

213. *1.* I purchased through a broker 400 shares West End at 27½ b. 30, and at the end of the time received the stock, which was then worth only 26¾. If the broker sold the stock for me on the same day what was my loss?

2. July 16 my broker purchased for me 300 shares N.Y., N.H. & H. R.R. pref. at 159½ b. 60. Aug. 27 he demanded the stock and sold it at 162½. What was my net profit?

3. A broker bought on his own account, Aug. 10, 250 shares Old Colony at 179¾ b. 10. Aug. 15 a 5% dividend was declared. At the expiration of the contract he took the stock and paid the seller the balance due him. How much was it?

4. July 25 I sold 200 shares Atchison, Topeka, & Santa Fé at 113⅝ s. 30, and July 30 delivered the stock which I had purchased on the same day at 113. What was my profit, no brokerage?

5. I purchased, June 16, 225 shares C. B. & Q. at 144¾ s. 60, and on June 30 a 3% dividend was declared. Aug. 15 I received the stock and paid the balance due the seller. How much was it, no brokerage?

6. July 20 I bought 100 shares B. C. & M. pref. at 104½ b. 60, and sold it on the same day at 106½ s. 60. Aug. 31 a settlement was made on both contracts. What was my net profit, allowing ⅛% for brokerage?

7. May 25 I purchased a Put on 300 shares Mex. Cen. at 15 for 3 months. July 31 the stock had declined to 12⅛, and on that date I purchased the stock at that price and made the delivery on the Put. What was my net gain, allowing usual brokerages?

8. April 8 I purchased a Call on 300 shares Bell Telephone at 108½ for 4 months. Aug. 1 the stock was worth 110½, and on that date I called the stock and immediately sold it at the advanced rate. What was my net gain, usual brokerage?

9. Aug. 15 I deposited a margin for the purchase of 400 shares Oregon Transcontinental at 30½. Sept. 8 the stock

was quoted at 35, and I ordered my broker to sell. How much was due me, allowing usual brokerage? What was my gain?

10. Sept. 28 I deposited a margin for the purchase of tne following stock: 200 shares B. & L. at 169; 200 shares N.Y. C. R.R. at 108¼; 400 shares No. Pacific pref. at 59⅝. Oct. 30 I ordered my broker to sell. He did so, receiving 169¾ for B. & L., 108 for N.Y. C., and 65½ for No. Pacific. Oct. 10 a 5% dividend was declared on the No. Pacific. How much did the broker pay me in settlement? What was my net gain?

11. What would have been my net loss from the investment in Problem 10 if No. Pacific had declared no dividend and the stock which I sold was down to 56 at the time of sale?

12. A broker sold "short" for me 400 shares W.U.T. at 76⅛ and 300 Pac. Mail at 43¾. W.U.T. afterward declined to 73¾ and Pac. Mail to 41, at which prices I ordered the broker to buy in the stock, to "cover my short." What was my gain, usual brokerage?

13. A broker, having purchased more stock than he could carry, was obliged to "make a turn," *i.e.*, to sell for *cash* and buy back *regular*. He therefore sold 300 shares Worcester, Nashua & Rochester at 137½, 200 shares B. & A. at 205, and 100 shares Eastern pref. at 105. He bought back regular the W. N. & R. at 138, B. & A. at 205⅛, and the Eastern pref. at 105¼. What did the "turn" cost the broker?

14. June 22 deposited a margin of $20 per share for the purchase of 200 Jersey Central. Broker bought the stock at 135 June 25 b. 60 and sold same on my order July 23 at 142½ s. 30. The stocks were delivered on both trades July 28. What balance ought the broker's statement to show Aug. 1, commissions and interest allowed as usual?

PARTNERSHIP.

214. PARTNERSHIP is the association of two or more persons for the purpose of transacting business as one person.

215. The persons thus associated are termed PARTNERS, and the association is called a FIRM, HOUSE, or COMPANY.

NOTE. — The relation of the partners to the business is set forth in a written instrument called the PARTNERSHIP CONTRACT. This paper also specifies the amount and kind of each partner's investment, the extent to which the business shall be carried, the way in which gains and losses are to be shared, etc.

216. Partners are distinguished as ACTIVE, SILENT, SPECIAL, and NOMINAL.

An ACTIVE PARTNER is one publicly known as a partner, who shares the gains and is liable for the losses.

A SILENT PARTNER is one who is not known as a partner, his name being concealed to avoid liability for debts of the firm. If his relation to the firm be discovered, he is equally liable with the active partner.

A SPECIAL PARTNER is one who invests a certain amount of capital and makes it publicly known that he is to be responsible for debt of the firm only to the extent of his investment.

A NOMINAL PARTNER is one who invests no capital, but allows the use of his name and credit for the benefit of the business, and thus becomes responsible as a partner.

217. The ASSETS of a firm are its entire property.

218. The LIABILITIES of a firm are the sums owed by the firm to outside parties.

219. The CAPITAL of a firm is its assets.

220. The NET CAPITAL of a firm is the difference between its assets and its liabilities.

221. The INSOLVENCY of a firm is the excess of its liabilities over its assets.

222. The NET GAIN is the excess of net capital over sums due the partners, or the excess of gains over losses.

223. The NET LOSS is the excess of sums due the partners over net capital, or the excess of losses over gains.

224. The INVESTMENT of a partner is the money or property furnished by him for the use of the firm.

225. The AVERAGE INVESTMENT of a partner is the average sum furnished by him for the continuous use of the firm, when he has invested or withdrawn, or both, from time to time.

NOTE. — The measure of a partner's average investment is the difference between the interest on his investments from the date of investment to the date of settlement, and the interest on his withdrawals (if any) from the date of withdrawal to the date of settlement.

SIMPLE PARTNERSHIP AVERAGE.

226. To divide the gain or loss in proportion to investments, when made for the same time.

RULE. — *Take such fractional part of the whole gain or loss as each partner's capital is of the joint capital.*

EXAMPLES.

1. A and B formed a copartnership for one year. A invested \$8000, B, \$5000. At the end of the time they had gained \$2400. What was each man's share? What was each man's capital at closing?

2. C and D are partners, C investing \$900 and D \$500. At closing, it is found they have lost \$360. How much of

the loss must each one bear? What is each man's net capital at closing?

3. Brown, Ross, & Co. have been in business for 1 year, and at the end of the time the business stands as follows: stock on hand, $8475.80; cash on hand, $4150; personal accounts due the firm, $3072.50; bills receivable, $2400; bills payable, $3267.90. Brown invested $5000, Ross $4000, and Donworth $2000. What is each man's share of the gain, and what is each man's capital at closing?

4. Manson, Goddard, & Lee are in business for a certain time. At the close of business a statement of their accounts shows: inventory, $13175.18; cash, $3500; debts due the firm, $24262.37; bills payable, $4400; book accounts against the firm, $3875.45. Manson invested $25000, Goddard $20000, and Lee $10000. What is each man's gain or loss and net capital at closing?

5. Allen, Edwards, & Co. settle in insolvency, the following being a statement of the business: bills receivable, $64287.40; cash, $4472.37; debts due on account, $29988.95; bills payable, $30000; owed by the firm on account, $95171.25. Allen had invested $20000; Edwards, $14000; and Morris, $12000. The above claims of all kinds held against the firm are divided as follows: Jones & Gay, $12354.76; Lord & Webster, $18872.28; Morey & Smith, $31711.29; Rice & Drake, $41118.80; and David Springer, $21114.12. What is each partner's share of the insolvency, gains and losses being shared according to investment? What will each creditor lose?

6. Sale, Wesson, & Wright commenced business Jan. 1, 1906, and invested $1000 each, agreeing to share gains and losses equally. At closing, Jan. 1, 1907, they found the company insolvent, partners' accounts standing as follows: Sale's debit balance, or net insolvency, $962.80; Wesson's debit balance, $891.47; and Wright's debit balance, $731.57. They continue the business, and at closing, Jan. 1, 1908, their balance-sheet showed the following result: Sale's account Dr., $1562.80; Wesson's account Dr., $1791.47; and Wright's account Dr., $1231.57; inventory, $3642.85; cash

on hand, $2781.19; debts due the firm, $4487.40; bills payable, $2400. What was each partner's share of the gain and net capital at this settlement?

COMPOUND PARTNERSHIP AVERAGE.

227. To divide gains and losses between the partners in proportion to their Average investments, when their capital has been invested for different times.

RULE. — *Find the difference between the interest on each partner's investments from the date of investment to the date of settlement, and the interest on his withdrawals (if any) from the date of withdrawal to the date of settlement. This difference will be the interest on the partner's average investment. Take such part of the gain or loss for each partner's gain or loss as the interest on each partner's average investment is of the sum of the interests on the several partners' average investments.*

EXAMPLES.

1. Gould and Davis formed a copartnership for one year. Jan. 1, Gould invested $4500, and Apr. 15, $3000 more. Davis invested $6000 Jan. 1, and Aug. 1 he withdrew $2400. The net gain for the year was $2500. What was each partner's share?

2. Jones, Eaton, & Brown are partners for two years. Jan. 1, 1907, the date at which the partnership began, Jones invested $4000, Eaton $3500, and Brown $2500. July 1, 1907, Jones withdrew $2000, and Sept. 1 of the same year Eaton withdrew $1500. Nov. 1, 1907, Brown added $2000 to his investment. At the end of two years they found the net gain to be $1041.80. What was each partner's capital at closing.

3. Jackson & Wilson have been doing business for 3 years, and at the date of closing, Dec. 31, 1907, their accounts stand as follows: Inventory, $8345.65; due on personal

accounts, $15109.20; bills payable, $8960; personal accounts against the firm, $5120.70; farm in Malden owned by the firm, valued at $4400; mortgage held by the firm on the property of C. W. Leach, $2000; accrued interest on same, $75; bills receivable, $12967.50. Jackson invested $10000, Jan. 1, 1905, and drew out $3000 Oct. 31, 1905. Wilson invested $8000 Jan. 1, 1905, and drew out $2500 Jan. 1, 1906. What was each partner's share of gain or loss and net capital at closing, the gain or loss to be divided in proportion to average investments?

4. Jan. 1, 1907, Rice & Drake were insolvent, the debit balance against Rice being $1437.35, and against Drake $927.45. They admitted two partners, — Clark, who invested $3000, and Myers, who invested $6000, — and continued the business, agreeing to divide gains and losses as follows: Rice and Drake to bear or sustain $\frac{1}{8}$ each, and the other two to share the remainder in proportion to their average investments. At the end of a year their resources, not including sums owed by partners, were $23718.64, and liabilities to outside parties $7813.11. Rice and Drake had drawn $1200 each, on which they were charged interest from July 1. Clark drew out as follows: April 1, $300; July 1, $500; Oct. 1, $700. Myers withdrew $250 Apr. 1, $430 July 1, and $600 Oct. 1. What was the balance of each partner's account at the end of the year?

5. Daniel Greene is a special partner in the firm of Greene, White, & Brown, and invested $24000 Jan. 1. White invested $10000 on the same date, and 4 mos. afterward $6000 more; July 1 he drew out $1200. Brown invested $4000 at first, and at the end of 6 mos. $4000 more. Sept. 1 he drew out $600. It is agreed that Greene shall be paid interest at 8%, and the others interest at 6%, on average investments, and these sums, as also a salary of $120 per month paid Brown for services, shall be deducted from the profits of the business, the remainder to be shared by the partners in proportion to average investments. The gain for the year before salaries and interest are paid is $12120. What is each partner's share of the gain, and what is his net capital, allowing Greene only his interest?

PRACTICE.

228. *1.* A, B, and C undertake to perform a piece of work and furnish materials for $2400 in partnership, and agree that each shall be charged $3 per day for loss of time, the profits or losses to be shared equally. A advances for materials $250, B, $300, and C, $190. A is absent 5 days, B, 8 days, and C, 3 days. How much should each receive?

2. A and B, of Boston, buy on equal shares a horse, carriage, and harness in New Hampshire for $250, A furnishing the money. B pays for hotel expenses, etc., on the way home, $15. Upon their arrival in Boston they sell the carriage and harness for $50, A receiving the money. How much does B still owe A?

3. W. S. Noyes, the owner of a store, employs E. S. Holden as manager, on the following conditions: Noyes is to furnish capital, and Holden to receive for his services one-third of the net profits. They employ a book-keeper and other assistants at a total expense of $3000, $\frac{1}{3}$ of which is borne by Noyes, $\frac{1}{3}$ by Holden, and the remainder by the business. At the beginning of the year the stock, etc., on hand amounts to $4500. During the year Noyes purchases for the store to the amount of $12341.20. Holden has received for cash sales $18416.10, of which sum he has paid to Noyes $17411.50. Outstanding accounts amount to $2160.95 and 5% of this sum is not considered good. Stock, etc., on hand at closing amounts to $5278.75. Noyes paid the salaries of book-keeper, etc., in full. How much is the balance due Holden?

4. A, B, and C enter into partnership, as follows: A to manage the business and receive therefor a salary of $2200, which sum is to be entered to his credit July 1. He is to receive interest on his salary and pay interest on withdrawals at 6%. B and C are to furnish capital and receive interest on the same at the above rate. A is to have a $\frac{2}{5}$ interest in the profits, B $\frac{2}{5}$, and C $\frac{1}{5}$. B invests $6000 Jan. 1, and $4000 June 1. C invests $8000 Jan. 1, $4000 more April 1, and draws out, Aug. 16, $950. A draws on account of salary $150 March 1, $500 April 1, $400 Aug. 1, $100 Oct.

1, and $350 Nov. 21. At the end of the year the gain is $7583.20, without taking into account the salary to be paid to A and the partners' interest. What is the balance of each partner's account at closing? A and B propose to buy C's interest in the business at closing, each to pay therefor a sum proportional to the interest which he now has in the profits. How much must each pay, and what will be each man's fractional interest in the profits of the new business?

5. Smith & Jones, builders, contract to put up a house for Brown, and furnish material for same, for $8750. When the job is completed the following conditions exist: Smith has paid wages amounting to $1672.50 and received on the contract $1160; Jones has paid for material $2543.75 and drawn on Brown for $2960. They have not paid the following bills: help, $1232.80; material, $2767.20. They divide gains and losses equally. Find the balance due on contract, the net gain, and the balance due each.

6. J and K lease a hotel for $10000, for 5 yrs., — J paying $\frac{3}{5}$, K $\frac{2}{5}$. They share gains and losses equally. The business for 2 yrs. shows: 1st year, receipts, $7862.09, expenses, $4381.25; 2d year, receipts, $9645, expenses, $5118.44. J. paid from private funds $795.80 of 1st year's and $\frac{1}{4}$ of 2d year's expense; he drew $1275 1st year. K paid $\frac{1}{3}$ of 1st year's and $1000 of 2d year's expense; he drew $2500 2d year. They then sell their lease for $8000, taking $6000 cash and a note for the balance, which K takes on account at 1% discount. Close the books for each year, regarding lease as worth $\frac{4}{5}$ its cost 1st year. Show the balance due each at the end of 2d year, the lessees not being accountable for any depreciation in value of furnishings.

ACCOUNT CURRENT.

229. An account current including interest is used to ascertain the exact balance of an account when payments have not been made on the date of maturity. Any date of settlement may be used, usually today, and interest is computed on each debit and credit item from the settlement date forward and backward to the maturity date. On the debit side of the account, debit interest is written in black ink, but on the debit side of the account, credit interest is written in red ink.

On the credit side of the account, credit interest is written in black ink, but on the credit side of the account debit interest is written in red ink. This is to distinguish debit interest from credit interest.

After finding each item of interest, the credit interest in red ink on the debit side of the account is transferred to the credit side of the account in black ink, to be added with the other items of credit interest in finding the balance of interest. The debit interest in red, on the credit side of the account, is transferred in black to the debit side to be added with the debit items in finding the balance of interest.

The balance of interest is to be added to the debit or credit side of the account. The balance of interest makes the interest columns add alike, provided you do not include items of interest in red ink. You must not add debit and credit interest together. The account is closed (*i.e.*, ruled in red ink) and the balance of account, including interest is carried down on the date of settlement.

The statement is dated and signed as in an account sale.

ILLUSTRATION OF AN ACCOUNT CURRENT.

Dr. H. M. DUFFILL IN ACCOUNT CURRENT WITH STUDENT. *Cr.*

Date.	Terms.	Matures.	Days.	Amount.	Interest.	Date.	Terms.	Matures.	Days.	Amount.	Interest.
19—.						19—.					
May 8	15 days note. .	May 23	23	$1500.00	$5.75	May 12	Cash	May 12	34	$966.00	$5.47
" 22	10 days note. .	June 1	14	2640.00	6.16	" 25	30 days note .	June 24	*9*	1260 00	*1.89*
June 1	30 days note. .	July 1	*16*	1386.00	*3.70*	June 2	5 days. . . .	June 7	8	1650.00	2.20
" 2	10 days note. .	June 12	3	864.72	.43	" 3	15 days . . .	June 18	*3*	2240.00	*1.12*
" 15	Int. in red. . .				3.01	" 12	Cash	June 12	3	280.00	.14
" 15	Int. Bal. Int. .			3.84		" 15	Int. in red. . .				3.70
" *15*	*Bal. Acct.* . .			*1.44*		" *15*	*Bal. Int.* . .			-	*3 84*
				$6396.00	$15 35					$6396.00	$15.35
						June 15	Bal.			$1 44	

NOTE.—The figures in italics indicate red ink.

In the above illustration the balance for June 15 is required.

COMPOUND INTEREST.

230. COMPOUND INTEREST is the interest computed on the entire amount of a loan as found at the end of each year or specified time by adding the principal and the interest then due.

231. Interest, when compounded at all, is usually compounded annually, semiannually, or quarterly.

232. To find the Compound Interest of any sum for any time.

RULE. — *Find how many times the interest is to be compounded in the given time.*

Find the amount of the principal for the first period or specified time. Make this amount the principal on which to find interest for the second period, and the amount of the second period, the principal for the third, and so on.

Find the amount of the last amount for the months and days, if any, less than an entire period, and this sum is the amount of the principal for the entire time. Subtract the principal, and the remainder is the compound interest.

NOTE 1. — The pupil should bear in mind that when the rate is any other than 6 per cent. the interest should be found each time at the given rate. That is, it cannot be found at 6 per cent. throughout the work, and then be changed to the interest at the given rate, as in Simple Interest.

NOTE 2. — In most places where Compound Interest is used, a table is given showing the amount of $1.00 at the rates in common use for from 1 to 50 years, or periods. The amount of any principal for any time within this limit is found by multiplying the amount of $1.00 for the given time, as found in the table, by the given principal.

EXAMPLES.

1. Find the amount of $1200 at compound interest from Feb. 28, 1907, to June 11, 1911, interest compounded annually.

2. What is the compound interest of $575 at 5% from July 23, 1903, to Aug. 6, 1907, interest compounded annually?

3. March 16, 1903, I borrowed $450, agreeing to pay interest at 4% per annum, interest to be compounded semi-annually. How much did I owe April 1, 1907?

4. How much is due me July 25, 1907, on a loan of $1550, made Aug. 10, 1902, at 4½%, on which no interest has been paid, the interest to be compounded semi-annually if not paid each 6 months?

5. Nov. 15, 1901, I borrowed $4800, agreeing to pay the interest semi-annually at 5% per annum, or allow the interest to be compounded when not paid as agreed. I paid the interest as due till May 15, 1903, and afterward paid nothing till Sept. 10, 1907, the date of final settlement. How much did I then owe?

6. I loaned $890 Jan. 1, 1905, at 6%, the interest to be compounded quarterly if not paid. The interest was not paid till Aug. 20, 1907, the date of settlement. What was the interest then due?

7. Which is the greater, and how much, the simple interest of $1575.50 at 4½% from July 24, 1904, to Oct. 19, 1907, or the compound interest of the same sum for the same time compounded quarterly at 4% per annum?

8. I borrowed $1950 Nov. 20, 1904, at 5%, with the agreement that the interest should be compounded when not paid quarterly. I made the first five payments when due, but failed to pay the rest till Sept. 13, 1907. What was the amount of my debt on that date?

9. A gentleman deposited $100 in a Savings Bank for the benefit of his son who was then 12 years of age. Each year thereafter he deposited $100 till his son was 21 years of age. What was the amount of this fund when he was of age, interest having been compounded annually at 4½%?

10. What is the amount of an annual rent of $450 due in semi-annual instalments, if unpaid from July 1, 1903, to Jan. 1, 1907, interest being charged at 5 per cent. and compounded when the payments were due?

ANNUAL INTEREST.

233. ANNUAL INTEREST is the simple interest on a principal secured by promissory note or other contract containing the words "with interest annually," or their equivalent. Annual interest may be payable annually, semiannually, or quarterly.

234. Annual interest is the same as simple interest if the interest payments are made when due.

235. When the interest payments are not made as agreed, annual interest becomes greater than the simple interest by the interest on the unpaid sums so long as they remain unpaid.

In some States annual interest is sanctioned by law, but in many States it cannot be legally enforced.

Annual interest is sometimes secured by a series of notes; in such a case, the principal only is secured by one of the series, while each of the other notes is drawn for one interest payment and matures on the date at which such payment is due. Thus, annual interest can be legally collected in States where it would otherwise be regarded as illegal.

236. To find the Annual Interest for the time during which no payments were made.

RULE. — *Find the simple interest on the principal for the unpaid time. Find the interest on each overdue payment from the time it was due till the date of settlement.*

Add together the interests thus found and the simple interest on the principal; the result will be the annual interest.

NOTE. — The work will be very much shortened by finding the interest on one overdue payment for the sum of the times for which they were all overdue, instead of on each payment for the time it remained unpaid.

EXAMPLES.

1. Find the annual interest of the following sums from May 16, 1906, to March 9, 1912, payments due annually and none made till the latter date: — $1450; $178.45; $2720; $983.50; $1175.37; $3800.

2. What is the annual interest of $2145 from Jan. 29, 1905, to June 5, 1910, at 5%, interest due annually and none paid?

3. What is the annual interest of $1860 from April 17, 1906, to Nov. 9, 1911, at 7%, interest due annually and none paid?

4. What is the annual interest of $368.40 from Dec. 31, 1902, to Sept. 1, 1907, at $4\frac{1}{2}$%, interest due annually and none paid?

5. Find the annual interest of the following sums from Jan. 30, 1904, to May 11, 1907, — payments due semi-annually and none made till the latter date: — $850; $1265; $1612.80; $2185.75; $7500; $525.50.

6. What is the annual interest of $1320, payments due semi-annually, from March 16, 1905, to Nov. 9, 1909, at 5% — no interest having been paid?

7. What is the annual interest of $950, payments due semi-annually, from July 17, 1903, to Nov. 30, 1907, at $7\frac{1}{2}$%, no interest having been paid?

8. What is the annual interest of $2845.50, payments due semi-annually, from Aug. 21, 1902, to July 19, 1907, at $5\frac{1}{2}$% — no interest having been paid?

9. Find the annual interest of the following sums from Feb. 21, 1905, to June 26, 1907, if the interest was due quarterly, and none was paid till the latter date: — $150; $287.40; $2150; $960; $1440; $98.

10. What is the annual interest of $875, payments due quarterly, from Nov. 13, 1905, to Jan. 7, 1908, at $6\frac{1}{2}$% — no interest having been paid?

11. What is the annual interest of $1014.85, payments due quarterly, from May 15, 1904, to July 3, 1907, at $4\frac{1}{2}$% — no interest having been paid?

MEASURES OF VALUES, WEIGHTS, CAPACITIES, EXTENT, AND TIME.

MEASURES.

237. MEASURE is the standard by the use of which the quantity of anything may be found.

Some of the different things to which we apply measures to find the quantity are:

Distances, Surfaces, Solids, Weights, Time, Values, etc.

NOTE. — Generally these subjects are treated under the title of Denominate Numbers, but, for our use, a brief statement of the tables with their uses is sufficient.

VALUES.

238. VALUE is the worth of anything, or what it will produce when sold.

MONEY is the measure of value.

239. UNITED STATES MONEY is the legal currency of the United States. It consists of gold coins, silver coins, U.S. Treasury notes, and national-bank notes.

240. LEGAL TENDER is a term applied to money which may be offered in payment of debts.

241. The unit by which values are measured is the gold dollar of 25.8 grains.

TABLE.

10 Mills	= 1 Cent	. . . . .	¢. or *ct.*
10 Cents	= 1 Dime	. . . . .	*d.*
10 Dimes	= 1 Dollar	. . . . .	$.
10 Dollars	= 1 Eagle	. . . . .	*E.*

NOTE. — In writing U.S. Money the decimal system is in general use, the table being made on the basis of tenths. Dollars and cents express values in commercial life. Mills are generally regarded as a cent if 5 or more; in other cases they are rejected.

ENGLISH MONEY.

242. ENGLISH or STERLING MONEY is the legal currency of Great Britain.

TABLE.

4 Farthings	= 1 Penny		*d.*
12 Pence	= 1 Shilling		*s.*
20 Shillings	= 1 Pound		£.

NOTE. — The unit is the Pound, worth in U.S. Money $4.8665.

243. The Director of the U.S. Mint is required to compare, once each year, the values of units of foreign moneys of account with the gold dollar of the U.S. and certify the result of his comparison to the Secretary of the Treasury, who proclaims the values of foreign money thus found to be the values to be used in estimating the worth of all foreign merchandise imported on or after Jan. 1 of the year for which the proclamation is made. The values thus found are called the *intrinsic*, or *real* values, and should be distinguished from *commercial*, or *exchange* values.

A table showing the values proclaimed April 1, 1907, will be found on page 125.

WEIGHT.

244. WEIGHT is the measure of size and density combined, or of the force of gravity.

NOTE. — Bodies on the surface of the earth are attracted to the centre of the earth by a force known as *Gravity*. This force depends on the size and density of the body, and is measured by the Troy Pound taken as a unit.

TROY WEIGHT.

245. TROY WEIGHT is used in weighing gold, silver and jewels; also, in weighing articles used in scientific experiments, etc. The unit is the pound.

TABLE.

24 Grains (Gr.)	= 1	Pennyweight . .	*dwt.*
20 Pennyweights	= 1	Ounce	*oz.*
12 Ounces	= 1	Pound	*lb.*

NOTE. — Diamond Weight is used in weighing precious stones. The unit is the *carat*, which equals about 3½ Troy grains. This carat is not the same as the carat used in finding the *relative* purity of gold in coins and jewelry. Pure gold is said to be 24 carats fine. If a piece of gold is said to be 18 carats fine the meaning is that the piece contains 18 parts of pure gold and 6 parts of alloy.

APOTHECARIES' WEIGHT.

246. APOTHECARIES' WEIGHT is used by physicians and apothecaries in compounding medicines not liquid.

TABLE.

20 Grains (Gr.)	= 1	Scruple	℈.
3 Scruples	= 1	Dram	ʒ.
8 Drams	= 1	Ounce	℥.
12 Ounces	= 1	Pound	℔.

NOTE 1. — The pound Troy and the Apothecaries' pound are the same. The only difference in the weights is in divisions of the ounce.

NOTE 2. — Avoirdupois Weight is used in measuring dry medicines, except in compounding prescriptions, recipes, etc.

AVOIRDUPOIS WEIGHT.

247. AVOIRDUPOIS WEIGHT is used in commerce in all cases where Troy, Diamond, and Apothecaries' weight are not used.

TABLE.

16 Ounces	= 1	Pound	*lb.*
25 Pounds	= 1	Quarter	*qr.*
4 Quarters	= 1	Hundred-weight .	*cwt.*
20 Hundred-weight	= 1	Ton	*T.*

NOTE 1. — Freights at the Custom House and wholesale quantities of coal are estimated by the *long* ton. By this estimate the qr. = 28 lbs.; the cwt. = 112 lbs.; the T. = 2,240 lbs.

NOTE 2. — The difference between Avoirdupois Weight and Troy and Apothecaries' Weights may be seen from the fact that 1 lb. Avoir. = 7,000 gr. Troy, and 1 lb. Troy = 5,760 gr. Troy.

248. Grain, seeds, and other farm produce are sold by the bushel of a certain number of pounds. The weight of the bushel of the various articles is in most States prescribed by law, but is not the same in all those States. The following table shows the weights adopted by Boards of Trade and the people generally: —

Barley	48 *lbs.*	Malt	34 *lbs.*
Beans	60 "	Oats	32 "
Buckwheat . . .	48 "	Onions	57 "
Clover Seed . . .	60 "	Peas	60 "
Corn, shelled . .	56 "	Potatoes	60 "
Corn, in the ear .	70 "	Rye	56 "
Corn-meal . . .	50 "	Rye Meal	50 "
Flax Seed . . .	56 "	Timothy Seed . .	45 "
Hemp Seed . . .	44 "	Wheat	60 "

Wheat Bran . . . 20 lbs.

249. The following measures or weights are also in use in commerce:

1 Quintal of Fish	= 100	*lbs.*
1 Barrel of Pork, Beef, or Fish	= 200	"
1 Barrel of Flour	= 196	"
1 Keg of Nails	= 100	"
1 Gallon of Refined Petroleum	= 6½	"
1 Gallon of Crude Petroleum	= 6½	"

CAPACITY.

250 The CAPACITY OF A VESSEL is that quantity of a substance which it is known the vessel will contain.

NOTE. — As substances generally used in commerce may be liquid or dry, one standard is required for measuring liquids and another for measuring dry substances, — the standard for the former is the gallon, and that for the latter is the bushel.

LIQUID MEASURE.

251. LIQUID MEASURE is used in measuring liquids.

TABLE.

4 Gills (*gi.*)	= 1 Pint	*pt.*
2 Pints	= 1 Quart	*qt.*
4 Quarts	= 1 Gallon	*gal.*

NOTE 1. — The standard liquid gallon contains 231 cubic inches.

NOTE 2. — Casks containing liquids are known as the tierce; the puncheon, the pipe, or butt; the tun, and the hogshead. The capacities of these casks are not absolute, but those sometimes used are respectively, 42 gals., 84 gals., 126 gals., 252 gals., and 63 gals. In commerce each cask is gauged and its capacity is marked upon it.

DRY MEASURE.

252. DRY MEASURE is used in measuring grain, fruits, vegetables, etc., when not sold by weight. (Art. 248.)

TABLE.

2 Pints (*pt.*)	= 1 Quart	*qt.*
8 Quarts	= 1 Peck	*pk.*
4 Pecks	= 1 Bushel	*bu.*

NOTE. — The standard bushel contains 2150.42 cubic inches. From this it will be seen that 4 qts., Dry Measure, contain about ⅛ more cubic inches than 4 qts., Liquid Measure.

APOTHECARIES' FLUID MEASURE.

253. Apothecaries' Fluid Measure is used in prescribing and compounding liquid medicines.

TABLE.

60 Minims (♏)	= 1	Fluid Drachm .	*f* ʒ
8 Fluid Drachms	= 1	Fluid Ounce .	*f* ℥
16 Fluid Ounces	= 1	Pint	*O.*
8 Pints	= 1	Gallon . . .	*Cong.*

NOTE. — The gallon of this measure is the same as that of Liquid Measure.

EXTENT.

254. MEASURES OF EXTENT are applied to things which have any or all, of the three dimensions, — length, breadth, and thickness.

255. Bodies to which measures of extent are applied may be divided into three classes:

1. *Those which have length only, as lines, or distances.*
2. *Those which have length and breadth, as surfaces.*
3. *Those which have all three of these dimensions, and are known as Solids, or Volumes.*

LONG MEASURE.

256. LONG MEASURE is used in measuring lengths or distances.

TABLE.

12 Inches (*in.*)	= 1	Foot . . .	*ft.*
3 Feet	= 1	Yard . . .	*yd.*
5½ Yds. (16½ ft.)	= 1	Rod . . .	*rd.*
40 Rods	= 1	Furlong . .	*fur.*
8 Furlongs (320 rds.)	= 1	Mile . . .	*mi.*

257. The following measures are also used:

1 Size	= $\frac{1}{3}$ inch. Used by shoemakers.
1 Hand	= 4 inches. Used in measuring the height of horses.
1 Fathom	= 6 feet. Used in measuring depths at sea.
1 Cable-length	= 120 fathoms.
1 Geographic mile	= 1.15 statute miles. Used in measuring distances at sea.
1 Knot	= 1 geographic mile. Used in measuring the speed of vessels.
60 Geographic miles, or $69\frac{1}{6}$ Statute miles,	= 1 degree of latitude or longitude.
360 Degrees	= The circumference of the earth.

SURVEYORS' MEASURE.

258. SURVEYORS' MEASURE is used by surveyors in running lines across land, laying out roads, etc.

The unit is *Gunter's chain*, which is 4 rods long.

TABLE.

7.92 inches	= 1	link	*l.*
100 links	= 1	chain	*ch.*
80 chains	= 1	mile	*mi.*

SQUARE MEASURE.

259. SQUARE MEASURE is used in measuring that which has length and breadth, as land, boards, etc.

NOTE. — The extent or quantity of a surface is determined by the number of square units which it contains. The number of square units is found by multiplying length and breadth together.

TABLE.

144 Square Inches (*sq. in.*)	= 1	Square Foot . . .	*sq. ft.*
9 Square Feet	= 1	Square Yard . .	*sq. yd.*
$30\frac{1}{4}$ Square Yards	= 1	Square Rod . . .	*sq. rd.*
40 Square Rods	= 1	Rood	*R.*
4 Roods	= 1	Acre	*A.*
640 Acres	= 1	Square Mile. . .	*sq. mi.*

NOTE. — In measuring land the *acre* is the unit; in most other surfaces, the *square yard.*

SURVEYORS' SQUARE MEASURE.

260. SURVEYORS' SQUARE MEASURE is used by surveyors in finding the area of land.

TABLE.

625 Square Links (*sq. l.*)	= 1 Square Rod or Pole	*sq. rd. or p.*
16 Poles	= 1 Square Chain . .	*sq. ch.*
10 Square Chains	= 1 Acre	*A.*
640 Acres	= 1 Square Mile. . .	*sq. mi.*

NOTE. — This table is made from Surveyors' Measure (Long), just as the table of Square Measure is made from Long Measure. Thus, a yard is 3 ft. long, and anything 3 ft. long and 3 ft. wide contains 9 sq. ft. or 1 sq. yd. So 1 chain is 4 rods long, and a piece of land 4 rods long and 4 rods wide contains 16 sq. rds. or 1 sq. ch. The process in either case is to multiply length by breadth. (Art. 259, Note.)

CUBIC MEASURE.

261. CUBIC MEASURE is used in measuring anything which has length, breadth, and thickness, as boxes, earth, stone, etc.

NOTE. — The contents of a solid or volume are determined by the number of cubic units which it contains. The number of cubic units is found by multiplying together length, breadth, and thickness.

TABLE.

1728 Cubic Inches (*cu. in.*)	= 1 Cubic foot .	*cu. ft.*
27 Cubic Feet	= 1 Cubic Yard,	*cu. yd.*

(*Wood Measure.*)

16 Cubic Feet	= 1 Cord Foot .	*cd. ft.*
8 Cord Feet (128 cu. ft.)	= 1 Cord . . .	*cd.*

NOTE 1. — A cord of wood is a pile 8 ft. long, 4 ft. wide, and 4 ft. high — or its equivalent.

NOTE 2. — 40 cubic feet of sawed timber are considered a ton, and 24¾ cubic feet of stone or masonry make 1 perch.

NOTE 3. — Lumber is measured by board measure. The board foot is 1 ft. long, 1 ft. wide, and 1 in. thick. Hewed and round timber is measured by *cubic* measure.

TIME.

262. TIME is a part of duration.

Time is measured by the daily revolution of the earth on its axis and its annual revolution around the sun.

TABLE.

60 Seconds (*sec.*)	= 1 Minute	*min.*
60 Minutes	= 1 Hour	*hr.*
24 Hours	= 1 Day	*d.*
365 Days	= 1 Year.	*yr.*

NOTE 1. — The day is the time during which the earth makes one revolution on its axis.

NOTE 2. — The *Solar Year* is the time during which the earth makes one complete revolution around the sun, and contains 365 days, 5 hours, 48 minutes, 49.7 seconds, or about 365¼ days. From this it will be seen that once in 4 yrs. we get a year of 366 days, or leap year. This extra day is given to the month of Feb., making for this month 28 days in an ordinary year, and 29 days in the leap year.

NOTE 3. — In business circles the year is regarded as containing 360 days, — 12 calendar months of 30 days each. This custom has arisen from the convenience in computing interest at 6 per cent. on this basis. In cases where it is necessary to be more accurate the necessary correction is easily made.

MONTHS OF THE YEAR, AND DAYS IN EACH.

January	31 days.
February	28 or 29 "
March	31 "
April	30 "
May	31 "
June	30 "
July	31 "
August	31 "
September	30 "
October	31 "
November	30 "
December	31 "

MISCELLANEOUS.

263. Some articles are counted by the following

TABLE.

12 Units or Things	= 1 Dozen . . .	*Doz.*
12 Dozen	= 1 Gross . . .	*Gro.*
12 Gross	= 1 Great Gross .	*G. Gr.*
20 Units or Things	= 1 Score	

264. Paper is measured by the following

TABLE.

24 Sheets	= 1 Quire	*Qu.*
20 Quires	= 1 Ream	*Rm.*
2 Reams	= 1 Bundle	*Bdl.*
5 Bundles	= 1 Bale	*Bl.*

REVIEW PROBLEMS.

1. Find the Cash Balance of the following account on the date of the last sale at $5\frac{1}{2}\%$:

1913		1913	
Sept. 21, Mdse., 1 mo.,	$100.00	Nov. 1, Cash,	$75.00
Oct. 5, " 60 d.,	150.00	" 28, 1 mo.,	110.50
" 30, " 30 d.,	116.50	Dec. 31, 2 mo.,	120.00
Dec. 18, " 60 d.,	251.45	Jan. 15, '14, Cash,	175.00
Jan. 31, '14, Mdse., 1 mo.,	80.75	Mar. 1, "	200.00
Feb. 28, " net,	100.10		

2. A note for $500 dated Jan. 1, 1907, with interest at 5%, has the following endorsements: Feb. 28, 1907, $50.00; Nov. 30, 1907, $5.00; Feb. 29, 1908, $40.00; Sept. 1, 1909, $4.00. What is due on the note Dec. 1, 1910, by Merchant's Rule? By United States Rule?

3. Find the interest on £457 14s. 7d. from May 22, 1910, to March 1, 1912, at $4\frac{1}{2}\%$.

4. Render consignor account sales of 831 bu. Corn at 58 cts. per bu. sold for cash April 16, and 500 bbls. Flour sold April 28 at $6.00 per bbl. on a/c at 30 days. Charges, April 5, Freight, paid in cash, $256.00; April 28, Storage, $9.16; Advertising, $5.00; Insurance, $4.35; Commission, $2\frac{1}{2}\%$ of sales. Cash advanced on const. April 10, $1000. Const. closed April 28.

5. I purchased stock at $4\frac{1}{2}\%$ discount and sold the same at $1\frac{3}{4}\%$ premium. If my net gain was $90.00, after paying brokerage for buying and selling, how many shares were sold?

6. A and B agree to build a house for C for $5000. A has received on the contract $2000 and has paid for materials $1500. B has drawn on C for $500 and has advanced for wages $700. A is charged $12.00 for lost time and B $4.00. They share gains and losses equally. Find balance due on the contract, net gain, and balance of each partner's account.

7. I deposited Oct. 10, 1913, a two-year note for $2500 bearing interest at 5%, dated Sept. 15, 1913, and a draft for $500 payable 5 mos. after date, dated Sept. 29, 1913, accepted Oct. 5, 1913. If discount on both was at $5\frac{1}{2}\%$, with what amount was I credited?

8. How large a draft on Liverpool can I buy with $2000 if exchange is at $4.86\frac{1}{4}$ and $\frac{1}{8}\%$ is charged for brokerage?

9. A merchant bought 25 yds. of cloth at $1.25 per yd. and 50 yds. of silk at 1.75 per yd. Having sold the cloth at a loss of 20%, he wishes to sell the silk for enough to enable him to make a profit of 20% on the total cost. What must he ask per yard for the silk?

10. Find the proceeds of a draft on Chicago for $12,000 payable 90 days after sight, exchange being at 50c discount and interest at 5%, 3 days additional allowed for acceptance.

11. Find the total duty on 3 T. 2 cwt. 1 qr. 12 lbs. of iron wire invoiced at 1s. 2d. per lb. at 4 cts. per lb., and 20% ad valorem, allowing 2% for tare.

12.

1914		1914	
Jan. 4, 4 mos.,	$637.20	Mar. 16, Cash,	$300.00
" 14, 4 "	412.87	Apr. 20, "	400.00
" 14, 60 d.,	214.35	May 3, "	200.00
Mar. 16, 4 mos.,	298.60	" 6, Note 4 mos.,	800.00
" 28, 30 d.,	973.25		

Find Cash balance May 1, 1914, at 5%.

13. I owe $6000, and to settle the debt I give a note for $3500 which matures in 18 days. For the balance I make a second note due in 60 days and large enough so that if it is discounted on its date the proceeds will exactly cancel the indebtedness. If discount in both cases is at 5%, what is the face of the second note?

14. Jan. 15, 1914, deposited margin for purchase of 200 shares Baltimore & Ohio at 102. Feb. 1 dividend of 3% was declared. Feb. 27 sold the stock at $105\frac{3}{4}$. Allowing brokerage and interest as usual, what was the gain?

15. I sold two farms for \$14,750, receiving $133\frac{1}{3}\%$ more for the second than for the first. I lost 10% on the first but gained 25% on the second. What was my net gain or loss and what %?

16. A town has real estate assessed for \$450,000 and personal property worth \$180,000. The amount to be raised is \$3913.95, not including the fee of 3% for collection. There are 310 polls at \$1.50 each, and license fees paid to the town are \$500. What is the tax rate per \$1000? What is the total tax of Mr. A, who owns \$12,500 worth of real estate and \$2000 worth of personal property?

17. May 1, 1913, bought on margin 200 shares Union Pacific at $179\frac{1}{2}$. May 21 sold the same at 185. After allowing interest and brokerage fees, what was the gain?

18. How large a 60-day draft must be drawn so that when it is sold at $\frac{1}{8}\%$ discount, interest 6%, it will yield \$1000 proceeds?

19. I sold 16,000 bu. of wheat at \$1.10 per bu. on a commission of 4%. I invested the proceeds in hardware for which I charged 5% commission. What was my total commission and how much was invested in hardware?

20. I sold a draft on Berlin and received \$905.32 as net proceeds. If rate of exchange was $95\frac{1}{2}$ and $\frac{1}{8}\%$ was charged for brokerage, what was the face of the draft?

21. What price must be asked for cocoanuts which cost \$4.00 per hundred in order to gain $33\frac{1}{3}\%$ and still allow for $16\frac{2}{3}\%$ breakage and 20% of bad debts in selling?

22. I bought stock at 180 and realized 5% on my investment. What will I have to pay for 10 shares of another stock which pays the same rate of dividend in order to clear 6% on my investment?

23. A mill valued at \$10,000 was insured for $\frac{3}{4}$ of its value at $2\frac{1}{2}\%$; the stock for \$2500 at $2\frac{1}{2}\%$, and the raw material worth \$3000 for $\frac{5}{6}$ of its value at \$1.25. What was the total premium?

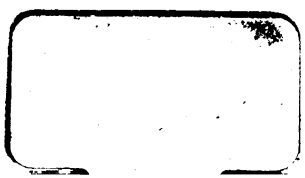
24. Bought a bill of exchange on Hamburg for 15,000 marks at $95\frac{1}{8}$, brokerage $\frac{1}{8}\%$. What was the total cost?

25. A man sold a carriage and gained 25%. With the proceeds he bought another which he sold at a gain of 10%, thus realizing a total gain of $75. What did he pay for each?

26. Render consignor account sales: Jan. 2, 1912, 350 bu. potatoes at 50 cts., cash; Jan. 30, 1200 bu. at 50 cts., 60 days; Feb. 1, 50 bu. at 60 cts., 10 days; Feb. 29, 50 bu. at 40 cts., 30 days; Mar. 4, 700 bu. at 70 cts., 90 days. Charges: Jan. 3, 1912, freight, paid in cash, $200; Jan. 4, drayage, $5.00, paid in cash; Mar. 4, storage, $1.77; commission, 4% of sales; Mar. 1, cash advanced, $700. Find balance due Apr. 1, 1912.

27. My R.R. stock cost me 140 and pays 7% annual dividend. At what price will an 8% stock yield me the same rate on the investment as the R.R. stock?

28. A vessel valued at $25,000 is insured for $20,000, and the cargo worth $20,000 is insured for $15,000. The damage to the ship is $4000 and there is a loss of $2000 on the cargo. What will be the total amount received by the owners? What will be the liability of a company carrying $10,000 risk on the vessel and $5000 on the cargo?

29. What is the total duty on 1248 yards of carpet 27 in. wide, invoiced at 3s. 6d. per square yard, if the rate is 28 cts. per sq. yd., and 35% ad valorem?

30. A and B form a partnership for one year and agree that each shall share the gain in proportion to their average investment and be credited with interest at the rate of 5% on all sums invested and charged at the same rate on amounts withdrawn. Jan. 1 A invested $2400. Feb. 6 he withdrew $800. Jan. 1 B invested $1500. July 31 he withdrew $750. The gain was $400. What was each partner's present worth Dec. 31?